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Feasibility Trawling Activities in the Great Australian Bight by the Korean Trawlers *Dong Bang 91* and *Dong Won 509* during the period 15.11.79 to 12.1.80

BY

MICHAEL H. WALKER
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AND
GERALD M. CLIFF

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FEASIBILITY TRAWLING ACTIVITIES IN THE GREAT AUSTRALIAN BIGHT BY THE KOREAN TRAWLERS *Dong Bang 91* AND *Dong Won 509* DURING THE PERIOD 15.11.79 TO 12.1.80

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ABSTRACT

Trawling activities in the Great Australian Bight by two Korean trawlers Dong Bang 91 and Dong Won 509 in the period 15.11.79 to 12.1.80 are reported. Vessels were issued with, and required to complete on a daily basis, research catch and effort log sheets. Observers were placed aboard vessels to assist in log book completion, species identification of the catch and to make reports on: vessel specifications, vessels mode of operation, fishing gear specifications, the fishing operation, completion of log sheets, trashing and retention of fish species on board, catches made, the condition of catch retained and the grading of the catch. These items are reported.

Comments are made upon the completion of the catch and effort log sheet by the vessels. Catches are summarized on a daily basis, according to species and overall according to the Korean commercial grades of species retained. The eventual utilization of the retained catch of one vessel is also given.

Catches and catch rates made by these vessels are also summarized by half degree grid squares for the months of November and December and compared with the British United Trawlers (BUT) Othello, Orsino and Cassio for the same time of year twelve months earlier. The catch rates made are also compared with most other vessels to fish the Great Australian Bight. The Korean vessels achieved slightly better catch rates than the BUT vessels, for the same months and other vessels to fish generally in the Great Australian Bight. This is discussed.

The most important species retained by the Koreans in order of importance were: deep water flathead, ray/stingaree, red snapper, latchet, squid, Jack mackerel, boarfish, knife jaw, jackass fish, gurnard perch, swallow tail, shark, gemfish, queen snapper, ruby fish, red gurnard, veilfin, leatherjacket, trevally and John dory.

I INTRODUCTION

Four Korean fishing trawlers operated in Western Australian waters, largely on the Northwest shelf, during 1979 under State/Commonwealth feasibility fishing arrangments. Two of these vessels, *Dong Bang 91* and *Dong Won 509*, were given permission by Government, late in 1979, to conduct demersal trawling operations in the Great Australian Bight between longitudes 116°E to 138°E and outside of 12 miles from shore.

Two observers from the Western Australian Department of Fisheries and Wildlife were involved with monitoring the activities of these vessels at sea in the Bight.

This report describes the operations of these Korean vessels in detail and represents the fishing results they obtained in the Bight, along with an assessment of such results, as a further contribution to the understanding of the demersal fish resources of the Great Australian Bight and how these resources might ultimately be utilized for Western Australia's and Australia's benefit.

It is not the intention of the report to comment on the economic success or otherwise of catch rates made by the Korean vessels or their relevance to the Australian industry. Opinions will depend on the criteria used for assessment by different sections of the fishing industry.

II METHODS

A. DATA COLLECTION

Dong Won 509 departed Fremantle for the Great Australian Bight on 13.11.79. She commenced fishing on 15.11.79, ceased operations in the Bight on 20.12.79, and arrived back in Fremantle on 23.12.79. *Dong Bang 91* departed from Fremantle on 15.11.79, commenced fishing on 16.11.79 and returned to Fremantle on 15.1.80. This vessel spent the period 2.1.80-7.1.80 travelling to and from the Bight fishing grounds for refuelling at Albany.

Two observers from the Western Australian Department of Fisheries and Wildlife, Mr S. Blight and Mr M. Cliff, sailed aboard *Dong Bang 91* on the 15.11.79 for the Bight fishing grounds. Mr S. Blight transferred at sea to *Dong Won 509* to assist with log book completion, species identification of the catch, and to observe the fishing operation. Mr M. Cliff transferred to *Dong Won 509* to commence biological sampling and examination of the catch. Observers followed written instructions as to sea duties and expected tasks (Appendix 1).

The vessels completed a daily trawling log for southern fish species (Appendix 2). The basic information sought by this log sheet was position and time interval of trawl (shot), depth, net type and catch according to species. The unit of retained catch was a pan, approximately 11 kg in weight (mean weight for all species 10.84 kg). Numbers

of fish landed and average pan weights per species are shown (Table 1). A separate grading sheet (Appendix 3) was provided as fish were graded routinely. This sheet collected grade information by shot for each species retained.

B. DATA ANALYSIS

Collected log book data recorded on a shot basis were grouped for catch (in pans) and effort (in hours) according to date. Mean pan weights were determined for each species as well as an overall mean pan weight. Where a mean pan weight was available for a particular species it was used to convert species composition data from number of pans to weight in kg. (i.e. Table 9). Where this was not available the overall mean pan weight of 10.84 was used. Also when catch and effort data was allocated to grid squares (Figures 6, 7, 8 and 9) the overall mean pan weight value was used.

Historical catch and effort data from the Great Australian Bight for the vessels *F.I.S. Endeavour*, *S.T. Bonthorpe*, *S.T.Ben Dearg* and *S.T. Commiles* was taken from Houston (1954) and for the *Southern Endeavour* from Kesteven and Stark (1967). Catch data in these papers was provided in the imperial measures of lb and cwt. They were converted to kg by use of the conversion factor wt (in kg) = wt (in lb) x 0.4536.

Catch and effort data for the Saxon vessels *Onward*, *Progress* and *Ranger; Miss Boomerang;* were taken from W.A. Department of Fisheries and Wildlife data, records and files (all unpublished). It is planned that such data be published in the future. Catch and effort data from the British United Trawlers operation is being prepared for publication.

Effort data available for the Saxon vessels is known to have been underestimated, however, catch data is reasonably accurate. Future analysis of catch and effort data recently located for one of the vessels may allow a better understanding of catch and effort data from these vessels. It was decided to present the data provided, with the comment that the effort was underestimated, rather than omitting it altogether. The location of catch and effort data for one vessel will allow the future determination of accurate catch and effort figures for that vessel and will indicate the level of adjustment necessary to correct effort figures for the other two vessels.

In addition to catch and effort data being combined for all a vessel's operations, catch and effort data, where available, were grouped according to the months of November, December and January for *Southern Endeavour*, *Miss Boomerang*, and the BUT vessels *Othello*, *Orsino* and *Cassio* for direct

catch rate comparison by grid square with the two Korean vessels. However, only the months of November and December were used for comparison as only 8 days fishing occurred for January by *Dong Bang 91*.

III RESULTS

A. VESSEL DESCRIPTION

Specifications of *Dong Bang 91* (Plate 1) and *Dong Won 509* (Plate 2) are given (Table 2). The layout of the bridge for each vessel is shown (Figures 1a and 1b).

B. CREW

Dong Bang 91 had a crew of 29 men which operated as two watches which changed at 0100, 0700, 1300 and 1900 hrs.

The watches were composed of:

1st engineer	2nd engineer
Oiler	Oiler
Winch operator	Winch operator
6 deckhands	6 deckhands
Factory manager 1	Factory manager 2
Chief officer	Night cook/factory hand
2nd officer	1st officer
	3rd officer

The Captain, Radio operator, Chief engineer and Cook were not on set watches.

Dong Won 509 had a crew of 30 men divided into two watches, which changed at 0100, 0700, 1300 and 1900 hrs.

The watches were composed of:

1st engineer	2nd engineer
Refrigeration engineer	3rd engineer
Electrical engineer (who also acted as No. 2 Factory manager)	No. 2 Oiler (also Winch man)
No. 1 Oiler (Winch man)	No. 1 Oiler
6 crew	Factory manager
Chief officer	6 crew
3rd officer*	2nd officer
	3rd officer*

The Captain, Radio operator, Chief engineer, Cook and Galley boy were not on set watches.

* There were two 3rd Officers on *Dong Won 509*

C. VESSEL OPERATION

Dong Bang 91 and *Dong Won 509* were stern trawlers capable, with the amount of warp they carried, of fishing to a depth of 200 metres. Both vessels were basically bottom trawlers as they carried no pelagic/midwater gear.

The trawl net was hauled up the stern ramp and the catch was emptied through a hatch in the deck to the deck below (the factory deck) (Plates 3,4 and 5). The catch landed on a steel sorting table (Plate 6). Once the net was shot away the deck crew went below and commenced sorting the catch into species. Fish of the same species and similar size were packed into metal pans which contained about 11 kg. The number of fish per pan varied according to species and size (Table 1). The pans were then placed onto a conveyor and transferred forward to the plate freezers, where they were placed for freezing (Plate 7). When the freezing process was complete, after about 3 hours, the frozen blocks of fish were separated from the pan, via a water bath, placed individually into a plastic bag and then packed two at a time into a cardboard carton. Cartons were banded with tape and labelled as to species and grade. The numbers of pans were noted by the Factory Manager whilst they were on the conveyor between the sorting table and the plate freezers (Plate 7). A grade was assigned to each pan depending upon size and species (Tables 4 and 5). The numbers and grades of cartons were recorded as they were stowed in the hold (Plate 8).

A catch of about 1 tonne took of the order of 1-1$\frac{1}{2}$ hours to sort, pack and stack into the frezers. It took about 15 minutes to shoot a trawl in 100 metres of water. Hauling time depended upon the depth of setting and the catch. An average hauling time was 20 minutes. Large catches i.e. about 10 tonne were difficult for both Korean vessels to haul, as their winches had about 10 tonne capacity. A catch of this order took in excess of an hour to haul. The vessels were restricted to fishing in waters less than 200 m because of the amount of warp they carried. Thus their operations were concentrated at the edge of the shelf above the 200 m contour.

D. NET DAMAGE

When the net was found to be damaged it was either repaired by rejoining the broken meshes or by replacing the damaged section with a new piece or panel of net. If the net was so badly torn or damaged that it needed major repairs it was changed for another net, a procedure which took about 20 minutes.

E. NET SPECIFICATIONS

Net specifications for *Dong Bang 91* and *Dong Won 509* are shown (Table 3, Figures 2, 3, 4 and 5).

F. OPERATIONS OF LOG SHEETS

(1) General

The southern trawl log (Appendix 2) was used to record catch and effort. The log recorded total catch, according to species, by shot. Vessels recorded catches also by grade (Appendix 3). Different species were often mixed together in the same pan, especially when they looked similar in appearance. e.g. latchet with red gurnard; thetis fish with all gurnard perch species; all shark species; gemfish with barracouta; and red snapper with nannygai and large swallow tail. (Common names are reconciled with scientific names (Appendix 4)). Logs were always kept on the bridge and were completed by the 2nd and 3rd officers, usually at conclusion of the shot. Grading sheets were completed at the end of the shot or the day. Fish tallies were determined in the factory, by the Factory Manager or his deputy and brought to the bridge, written on a piece of paper, for inclusion in the log. To avoid misidentification, polaroid photographs were taken of each commercial fish species, to which was assigned a number. All catches were recorded in the factory by number then converted on the bridge from numbers to common names. It was normal practice for the crew of Korean vessels to refer to a fish species by number.

Two additional different log books were completed on the bridge, one for the Korean Fishing Company, to whom the vessel belonged, and one for the Korean Fisheries Department.

An item by item analysis of the daily trawling log sheet (Appendix 2) follows. Comment is also passed upon inconsistencies and short-comings in logsheet completion.

(2) Trawl details

(i) Time commenced fishing and commenced hauling was recorded in western standard time.

(ii) Position commenced fishing and commenced hauling. Where it was possible radar was used to determine position. However, as usually the vessel was too far offshore to utilize radar, dead reckoning was used to estimate position. At least once a day celestial navigation using a sextant was used to accurately fix position. When this occurred the vessel was usually found to be in a different position to that computed by dead reckoning. This was the result of a cumulative error resulting from the use of a compass course and lapse time to determine the vessel's position.

(iii) Fishing time was the difference between the shooting and hauling time.

(iv) The average course was the average compass course during the trawl.

(v) Fishing depth range. This was either the variation in depth from least to greatest for a trawl or the depth at the start and the finish of the trawl. The usual fishing strategy was to follow a depth contour thus there was only a small variation in depth for a trawl.

(vi) Bottom type. This was determined from the apparent configuration of the sea bed, as observed on the echo sounder(s) during the course of the trawl and by examination of the material brought up in the net.

(vii) Wind. Wind force according to the Beaufort scale of 0-12, along with its compass direction was recorded for each trawl.

(viii) Total height of sea and swell was recorded according to an international set of standards, by number. This was often also recorded in the ship's log.

(ix) Barometer reading was recorded in millibars.

(x) Net type. The type of net used for each trawl was entered.

(xi) Mesh size. The mesh size of the cod end was usually listed. This was recorded in millimetres.

(xii) Stretched head-rope length was entered, recorded in metres.

(xiii) Remarks included notes as to damage to gear, along with total catch estimates, surface temperatures and general comments.

(xiv) Species caught were entered under the appropriate English common name and assigned code. The unit was a pan approximately 11 kg in weight. Species not listed on log sheet were written under 'others' along with a determined common name. As mentioned, transcription of these data occurred on the bridge into the log book from a piece of paper brought up from the factory and in some cases species of similar appearance were combined.

(3) Number of trawls per sheet

Sometimes more than 8 trawls were conducted in a day. As the daily log sheet only allowed for a maximum of 8 trawls, two log sheets had to be used for one day. As many as 11 trawls were conducted during a day.

G. SPECIES RETAINED AND GRADES USED FOR THEM

The species retained (common name) and the condition in which they were saved is shown (Table 4). Species were also grouped according to a number from 1 to 8, depending upon general body shape and size, e.g. all small fish such as swallowtail, ruby fish and jack mackerel were known as number 3. Table 5 shows the species grouping (1-8) and the numbers of fish which were assigned to a particular grade. Grade categories were generally: extra large (LL), large (L), medium (M), medium small (S), small (2S) and very small (3S). If fish were just oversize, then the tail was often cut and bent underneath so as to fit into the pan. The majority of species were retained whole. The species common names used by the vessels on log sheets, etc. were reconciled with appropriate scientific names and the family(ies) to which they belong. (Appendix 4).

H. TRASHING ABOARD THE VESSEL

Generally the fish trashed by the Koreans were small fish unsuitable for processing because of their size. Some of the larger fish species which were always trashed were: porcupine fish, large shark, ringed toadfish, and fiddler shark. Leather jacket were initially retained but later were trashed when it was realized that it took considerable time to head, gut and skin these fish, as required by the Korean market. Specific trash details from an analysis of 7 shots, in the period 20.11.79 to 17.12.79, are shown (Table 6). Total catch is given along with: the catch retained, weight of sponge, etc. (not fish); and the weight of fish trashed.

I. CATCHES MADE

Catch species composition and fishing effort for *Dong Bang 91* and *Dong Won 509*, on a daily basis, is shown (Tables 7 and 8).

Catch species composition, on a trip basis, for both vessels individually and together are given (Table 9) in terms of percentage species composition and order of importance rated from 1-20. The most important species overall were deep water flathead (31.3% of the catch), stingarees (12.0%), red snapper (10.8%), latchet (10.0%), squid (7.7%), Jack mackerel (5.4%), spotted boarfish (5.2%), knife jaw (3.4%), jackass (2.6%) and gurnard perch (2.5%).

Dong Bang 91 caught significantly more deep water flathead than *Dong Won 509* (40.6% compared to 20.0%). The composition in terms of other species, was similar for the two vessels with only minor differences being observed e.g. red snapper (12.0% compared to 9.4%).

The species composition of the entire retained catch made by *Dong Bang 91* by grade is given (Table 10) and *Dong Won 509* (Table 11).

Dong Bang 91 in the period 16.11.79 to 12.1.80 conducted 374 trawls, for a fishing time of 819.54 hours and made a total catch of 20 184 pans (218 795 kg). The overall catch rate for this vessel was 267 kg/hr. *Dong Won 509* in the period 15.11.79 to 20.12.79 conducted 318 trawls, for a fishing time of 572.21 hours and made a total catch of 16 642 pans (180 399 kg). The overall catch rate for *Dong Won 509* was 315 kg/hr.

The utilization of the catch retained by *Dong Won 509* is shown (Table 12). The following species were processed in Perth and sold commercially through retail outlets such as supermarkets: jackass fish, red snapper, nannygai, deep water flathead, knife jaw, black spot boarfish, yellow spotted boarfish, queen snapper, hapuku, John dory, Australian tusk, pink snapper, moonlighter and veilfin. Large latchet and red gurnard were processed and sold commercially within W.A. Smaller specimens were sold as bait. Ruby fish, Jack mackerel, and swallow tail were utilized as bait. Some trevally was processed and sold within W.A. and some sent to Malaysia for canning, as was all the blue mackerel. Squid and cuttlefish went to Korea with the vessel and was then exported to Japan. Warehou, stingaree and some shark went to Korea with the vessel. There is no market in Australia for stingaree or stingray flaps. Some shark, all the Sergeant Baker, elephant shark and gurnard perch, although retained by *Dong Won 509*, were dumped as they were assessed as having no commercial value. Barracouta and gemfish were also dumped as they were of poor quality, being either badly damaged in the trawl or during processing.

Catch rates of the Korean trawlers were compared with other vessels to fish in the Great Australian Bight including the British United Trawlers *Othello*, *Orsino* and *Cassio* (Table 13). The Korean vessels obtained better catch rates for November and December than any vessel to fish the Bight area, including the British United Trawlers. Overall catch rates of 267 kg/hr for *Dong Bang 91* and 315 kg/hr for *Dong Won 509* were similar to overall demersal catch rates for *Othello*, *Orsino* and *Cassio* (308, 323 and 282 kg/hour respectively).

The catch, converted to kg, and effort in hours is shown for both vessels combined for the months of November and December according to $\frac{1}{2}$ degree grid square (Figures 6 and 8). Similar results obtained by the three British United Trawlers combined for the same months are shown (Figures 7 and 9).

IV DISCUSSION

The most important species caught and retained by the Koreans, in order of importance were: deep water flathead, ray/stingaree, red snapper, latchet, squid, Jack mackerel, boarfish, knife jaw, jackass fish, gurnard perch, swallow tail, shark, gemfish, queen snapper, ruby fish, red gurnard, veilfin, leatherjacket,

trevally and John dory. Small fish, too small for processing, were generally trashed as were porcupine fish, large sharks, toadfish and fiddler sharks. Leatherjackets were originally retained, being headed, gutted and skinned, as required for the Korean market. After a period, however, it was decided that to process leatherjacket to the state required, was too time consuming, and they were thenceforth trashed.

All species, when retained, were sorted according to species and size and were placed into metal pans, which were assigned a grade depending upon the size, number and shape of the fish concerned. Most species were retained whole, with larger fish being dressed i.e. headed and gutted or headed, gutted and tailed. Tails were often cut and bent underneath or removed entirely so as to fit the pan, which contained on the average 10.84 kg of fish.

It is difficult to compare this Korean based operation with an Australian market orientated one such as the British United Trawlers/Southern Ocean Fish Processors operation. However, it is clear that the Korean vessels retained more species than would be anticipated by Australian vessels, which for example would not retain ray/stingaree. Ray/stingaree were second, in order of importance, in Korean catches. It was considered that each operation must be taken in terms of the catch retained as observed/reported, for each operation retains different species. Also different vessels even within the same nationality group or operation are not entirely consistent in their trashing or retention techniques. No attempt was therefore made to compare the catch data after removal of such species.

The Korean fishing technique/pattern was a little different to that of the British United Trawlers (BUT) in that the Koreans fished slightly shallower water. The result of this can be seen in predominant catches of deep water flathead and a lesser importance of jackass fish, when the species composition of Korean and BUT catches are compared. Deep water flathead was the most important species for both Korean vessels and jackass fish rated 7th and 12th,, and 9th overall. Deep water flathead was rated 5th in order of importance and jackass fish 3rd for BUT demersal catches. As indicated in the order of importance of jackass fish for both Korean vessels, i.e. 7th and 12th, even vessels of the same nationality can produce/-encounter a different species composition in their catches (Table 9). This can be attributed to the ability of the skipper and crew in rigging nets, the ability of the skipper to select trawling bottom, and the difference in the capability of the vessel, i.e. power, speed, etc. For the same reasons differences in catch rates between similar fishing vessels of the same nationality can occur (Table 13).

Comparison of catch rates for the months of November and December for the Korean vessels and the BUT vessels each combined according to nationality (Figures 6, 7, 8 and 9) reveal, as stated, that the Korean vessels overall fished in shallower water than BUT vessels and that when both sets of vessels fished in the same half degree blocks similar catch rates were obtained. Generally the shallower blocks fished by the Koreans, but not by BUT, gave the best catch rates (Figure 6 and 8). Comparisons between the two groups of vessels may not be valid, as mentioned, as the Koreans retained [illegible] species not retained by the BUT vessels. Both sets of catch rates, however, are of value as they provide an indication of what might be expected from fishing with trawlers of differing size similar to the Korean or BUT vessels, for the months of November and December, according to fishing area by ½ degree grid square for the Great Australian Bight.

Comparison of overall catch rates for all vessels to fish in the Great Australian Bight (Table 13) reveal that the Korean vessels *Dong Bang 91* and *Dong Won 509* attained catch rates of the same magnitude or slightly better than those attained by the British United Trawlers *Oneko*, *Orino* and *Cassie*. For the reasons, previously outlined, catch rates were not adjusted to accommodate the different catch retention patterns of the vessels. The retention of rays and stingarees by the Koreans (2nd in order of importance in retained catches), which were trashed by BUT vessels, would have accounted for some of the difference but not all. Thus it would appear that the Korean vessels managed to achieve slightly better catch rates than achieved by the British United Trawlers for the same time of year i.e. November and December. The same impression is obtained if mean catch rates per day on the ground are compared rather than mean catch rate per hours trawling (Table 13).

The Korean vessels showed an improvement in catch rate on other vessels to fish the Great Australian Bight (Table 15). An increase in efficiency is apparent, which is expected, with the improvement in vessels and gear with time. Direct comparisons are difficult because of the different retention patterns, gear, fishing power, etc. of the different vessels.

V ACKNOWLEDGEMENTS

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TABLE 1: Numbers and mean weight per pan for species retained by Korean vessels in the Great Australian Bight.

Species Name	Number per pan				Weight per pan (kg)			
	Mean	n	SD	Range	Mean	n	SD	Range
Piked dogfish	3	1			10.95	1		
Black stingray	2.33	3	2.33	2-3	11.70	3	0.92	10.65-12.37
Wide stingaree	14.95	21	3.60	10-22	11.86	50	1.56	9.87-19.0
Australian tusk	8.50	2		8-9	11.49	2		11.31-11.67
Bight redfish	10.50	30	0.78	9-12	10.57	30	0.46	9.87-11.83
Swallow tail	66	3	5.29	60-70	11.26	3	0.43	10.67-11.71
John dory	13	1			10.85	1		
Veilfin	18	1			11.47	1		
Gurnard perch (3 species)	29.64	14	5.62	19-38	11.19	14	0.59	9.93-11.84
Red gurnard	23	1			11.12	1		
Deep water flathead	10.69	48	3.52	5-20	10.92	48	0.90	9.47-14.5
Trevally	11	7	4.83	6-17	11.09	7	0.48	10.42-11.63
Jack mackerel	133.5	4	12.61	120-150	11.37	24	0.51	10.63-12.37
Rubyfish	26	1			11.41	1		
Black spot boarfish	24.67	3	2.52	22-27	10.64	3	0.10	10.55-10.75
Spotted boarfish	7.17	24	1.13	5-10	10.96	24	0.76	9.87-13.0
Knife Jaw	14.67	15	3.24	10-21	11.18	15	0.70	9.97-12.17
Sea bream	16	8	1.31	14-18	11.03	8	0.56	10.62-12.35
Queen snapper	4	1			11.87	1		
Gemfish	7.5	2		7-8	10.30	2		9.51-11.09
Leatherjacket	42.8	5	11.39	30-57	11.21	5	0.48	10.61-11.82
Squid	21.8	5	4.97	18-29	11.59	5	0.28	11.37-12.07

Mean pan weight all species 10.84 kg.

TABLE 2 Vessel specifications *Dong Bang 91* and *Dong Won 509*.

	Dong Bang 91	*Dong Won 509*
Built:	Niigata Iron Works, Japan 1970	Yamanish Shipbuilding Company, Japan 1970
Type:	Deep water stern trawler	Deep water stern trawler
Reg. No.	M.U.F. 11798 (Mukho, Korea)	105574 (Busan, Korea)
Call sign:	6MGO	HMJC
Overall Length:	51.71 m	52.9 m
Beam:	8.80 m	8.9 m
Depth:	5.66 m	5.925 m Draft 3.8 m
Gross tonnage:	350.531	349.72T
Nett tonnage:	166.50T	193.30T
Crew capacity:	29 men	32 men
	Hold 1 2 3	Hold 1 2 3
Fish hold storage:	Boxes 2500(60T) 3150(76T) 3320(80T)	Total 397 m^3 Storage 50T 70T 80T
Refrigeration storage:	(4 plate freezers 96 pans each)	Total 39.58 m^3 (4 plate freezes, 99 pans each)
Working space:		92.28 m^3
Fuel Oil:	321.09 m^3 Trawl usage 6.2T/day	321.70 m^3 276.84T Trawl usage 5T/day
Lubrication oil:		5.08 m^3
Fresh water:	23.36 m^3 (can produce 1.0 m^3/day)	20.54 m^3 (30 mt can produce 0.7 mt/day)
Max. speed:	13.0 knots approximately	14.26 knots
Helm:	Gylot, Tokoyo Keiki GLT 103	Gylot, Tokyo Keiki
CP Box:		CE 10 Akasaka
Trawl winch:	10T x 80 m/min (central winch 20T at 40 m/min.)	10T x 80 m/min (600 m warp each drum)
Windlass:		3.5T x 14 m/min. Hydraulic
Cargo winch (1)		1.5T x 30 m/min x 2 Hydraulic
(2)		2T x 30 m/min. x 2
Main engine:	Niigata GMC31EZ 2000 PS	Akaska AH 38 2000 PS
Auxillary:	Niigata 6 cyl. 200 PS x 2	Yanmar 6 Ral 200 PS x 2
Generators	Niigata 6 cyl. 160 KVA x 2	Yanmar 6 Ral 160 KVA x 2
Refrigeration compressor	Mitsubishi x 2 Ammonia compressors MA-8-N2	Mycom x 2
Propeller:		Kamome C2508 2.5 m/m x 1000 x 3 each
Surface water temp.	Gauge readout	Muranyama (with chart recorder)
Main radar:	Furuno FRL 100-44 Series 842, max. range 100 mile	JRC JMA 164 96 mile
Aux. radar:	Kyoritsu Marine Radar Indicator Unit, Type MCL 3S12D No. 255, max. range 100 mile	JRC JAA 150 c 60 mile
Gyro compass:		Saura Keiki T 165 II F
Main Echo Sounder (2):	Oki Kaiyo New Televigraph freq. 28, 75 KHZ 800 m range	Koden SR 396 AH 28,50 KHZ 3600 m range.
Net sounder:	Furuno FNR 4R-70156	Koden NM 850. Range 90 m down, 60 m up.
Main echo sounder (1):	Sanken New Televigraph TL32 21161 freq. 28, 75 KHZ 800 m range	Koden SRM 872 freq. 28, 50 KHZ 1600 m range.
Facsimile:	Koden FX 753	FX 750 Koden
2 MHZ RDF:		Koden 71 KS 576 A
27 MHZ RDF:		Koden KS 398
LORAN C:	Koden LR 730 370303	Furuno DC 244
LORAN C:		JRC NLD-346/JNA 108
Marine vane:		Koshin Denki (m/sec)
VHF radios: (i)	(i) Furuno 27-28MHZ DR 1-3 1 watt freq. 27.821, 27.835, 27.885, 27.901 MHZ, range approx. 40 miles.	(i) SSB SD55 freq. 27.0225, 0545, 2345, 3625, 4665, 8224, 8384, 8864, 9024, Emerg. 0524 MHZ.
	(ii) Oki Kaiyo TRS 25 cm SSB freq. 27.0225, 27.0545, 27.2345, 27.2345, 27.3625, 27.4585, 27.4665, 27.3785 MHZ.	(ii) AWA Pilot Phone VI VHF marine transceiver channels; 16, 26, 67, 70, 73.
	(iii) TR 6213 DSB 150 MHZ 158.17, 158.57, 159.21. range approx. 10 miles.	
Main transmitter:	Main transmitter and receiver 'Anritsu' TK09B	Telegraph only NSD 256L 250w JRC
Aux. transmitter:		NSD 1127c 250w JRC
Freq. range:	410KC - 22 MHZ	0-29 MHZ
Main receiver:		HRD IEL JRC 0 - 29 MHZ
Aux. receiver:		NRD 1092 JRC
2MHZ transceiver:	SSB 'Anritsu' 50 SS12A freq. 2182, 2199.5, 2320.5, 2639.5	SSB JAA 309E freq. 2183.49, 2182.5, 3199.4, 2320.4, 2639.4, 4409.4, 4139.5, 4409.4, 4110.8, 8783.2, 8281.2, 8732, 8249.2 MHZ.
Direction finder:	2-5 MHZ RDF Koden KS 500	0-25 MHZ RDF Koden
Magnetic compass:	T165 BF Osaka Nunotaki, Seiki Co. Ltd.	

TABLE 3: Otter trawl net specifications for the Korean vessels *Dong Bang 91* and *Dong Won 509* in the Great Australian Bight.

		Dong Bang 91	*Dong Won 509*
NET 1			
Number of meshes round at centre of footrope	Belly	150	134
	Wing	116	76
	Delta	50	50
	Top Part	92	112
	Total	469	498
Mesh size (mm) at 'A' (diagonal stretched mesh)	Belly	150	150
	Wing	120	150
	Delta	120	150
	Top part	120	150
Headrope length (m)		41.4	48.0
Footrope length (m)		55.6	57.1
Cod end mesh size (mm)		90	45
NET 2			
Number of meshes round at centre of footrope	Belly	150	144
	Wing	93	122
	Delta	40	35
	Top part	74	100
	Total	490	558
Mesh size (mm) at 'A' (diagonal stretched mesh)	Belly	150	135
	Wing	150	135
	Delta	150	135
	Top part	150	135
Headrope length (m)		44.6	38.5
Footrope length (m)		58.8	47.6
Cod end mesh size (mm)		90	45

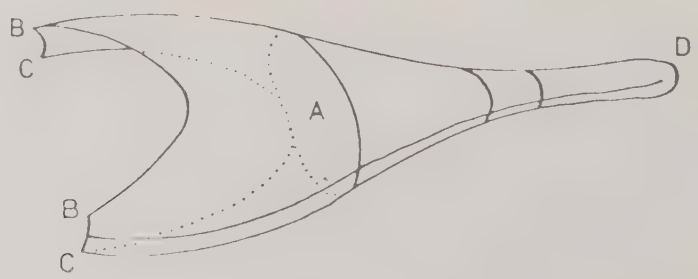


TABLE 4: Species and their condition saved by Korean vessels in the Great Australian Bight

Species group also given for *Dong Bang 91* only.

Species	Species Group DB 91	Condition saved
Shark	6	Above 60 cm dressed
Gummy shark	6	large specimens dressed
Angel shark		trashed
Stingrays & skates		flaps cut off and panned
Stingarees		whole
Elephant shark	1	whole
Pilchard		whole
Sergeant Baker	2	whole
Australian tusk	2	whole
Nannygai	3	whole
Bight redfish	2	whole
Swallow tail	3	whole
John dory	1	whole
Silver dory	1	whole
Veilfin	2	whole
Gurnard perch	2	whole
Red gurnard	2	whole
Latchet	3	whole
Deep water flathead	R2:D3	whole DB91, larger fish dressed DW509
Hapuku	8	filleted and cut to fit pan
Trevally	large 2	whole, large fish headed and tailed
Yellowtail kingfish		whole, large fish headed and tailed
Jack mackerel	3	whole
Ruby fish	3	whole
Pink snapper	large 1	whole, large fish, headed and tailed
Red mullet		whole
Moonlighter		whole
Spotted boarfish	large 1	whole, large fish headed and tailed
Black spot boarfish		whole
Knife jaw	2	whole
Queen snapper		headed and tailed, sometimes dressed
Jackass fish	2	whole
Barracouta	7	whole, above 60 cm headed and tailed
Gemfish	7	whole, above 60 cm headed and tailed
Bonito	2	whole
Blue mackerel		whole
Warehou	1	whole
Leatherjacket		headed, gutted and skinned
Squid	4	whole
Cuttlefish	5	whole

dressed=headed and gutted dressed=D whole=round=R

TABLE 5: Species and grade groups used in the Great Australian Bight by *Dong Bang 91*. Grades depended on shape and size of fish.

Species Group	Grade						Pan wt (kg)
	LL	L	M	S	2S	3S	
	(Numbers of fish per pan)						
1	1-7	8-14	15-21	22-28	29-35	>35	12
2	1-10	11-20	21-30	31-40	41-50	>50	12
3	1-15	16-30	31-45	46-60	61-75	>75	12
4	1-25	26-40	41-55	56-75	76-120	>120	13
5	1-5	6-8	9-12	13-17	18-21	>21	13
6	1-5	6-8	9-12	13-17	>17		12
7	1-8	9-12	13-21	22-26	>26		10
8	5 filleted						12

TABLE 6 Fish species and size trashed by the Korean trawlers, *Dong Bang 91* and *Dong Won 509* for 7 trawls in the Great Australian Bight.

Date	20.11.79	24.11.79	28.11.79	3.12.79	4.12.79	10.12.79	17.12.79
Vessel	DB 91	DB 91	DW 509	DW 509	DW 509	DW 509	DW 509
Depth	124–127 m	110–116 m	104–108 m	120–128 m	113–120 m	114–120 m	105–110 m
Position latitude	33°38-38'S	33°11-09'S	33°23-17'S	33°23-28'S	33°24-29'S	33°38-42'S	33°34-39'S
longitude	125°47-55'E	126°16-23'E	126°02-06'E	125°58-51'E	125°53-47'E	125°38-30'E	125°36-30'E
Total catch made	1800	1400	400	2500	500	1300	1200
Wt of fish retained	1200	900	200	1100	200	900	550
Wt of sponge, etc. trashed	200	100	50	200	100	100	200
Wt of fish trashed	400	400	150	1200	200	300	450
Wt of trash examined (approx.)	30kg	30kg	76kg	70kg	33kg	61kg	62kg

Species trashed	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size
One finned shark	2	~80												
Port Jackson shark											1	57	1	52
Catshark (2 species)	1	~50									1	38		
Sawtail shark											1	24		
Piked dogfish	4	50–75									1	52		
Southern sawshark	3	~90	2	81–127	2	80–120	1	120			6	65–97	2	100–105
Southern fiddler			2	77–85					3	75–93				
Ornate angel shark	1	75			2	80							1	54
Wide stingaree	7	~40	6	17–44	5	38					5	35–42		
Conger eel											1	42		
Cucumber fish	1	19												
Southern rock cod											1	29		
Australian tusk											1	24		
Nannygai	2	10–18												
Swallow tail			2	15–20	26	14–19	6	21–25					87	13–23
Veilfin	3	20–30			1	20			1	19	4	13–25		
Gurnard perch (3 species)	4	15–25	2	24–26	3	22	6	21–28	9	23–30	4	6–25	4	22–24
Latchet	35	23–30	30	17–28	3	24	20	21–29	6	24–28	11	20–26	6	20–24
Red gurnard							1	35						
Deep water flathead			3	37–47			1	39						
Butterfly perch													6	10–19
Rosy perch					3	9–14							1	17
Three spined cardinal fish	7	8–11					87	8–12			48	7–10		
Jack mackerel	10	20–25	23	16–30	2	8–16	19	16–23			32	19–27	11	20–24
Ruby fish	12	23–25									1	12		
Spotted boarfish											1	24		
Blackspot boarfish	1	25	3	23–26					5	23–28	1	27		
Knife jaw					1	15			1	23	1	18		
Jackass fish	2	23–25							1	32				
Deep water stargazer	7	20–24					3	21–23			24	23–25	4	22–25
Barracouta	2	45												
Gemfish	1	32					3	34–38			20	25–39		
Blue mackerel	1	23	1	24			1	28						
Chinaman leatherjacket	8	32–45	12	36–43	43	25–45	76	30–45	19	34–41	21	35–42	68	22–49
Leatherjacket (2 species)			1	40	2	37–43			2	38–46				
Boxfish (2 species)			2	21–25	2	12–25	2	21						
Ringed toadfish	1	21	3	21–22	6	21–24	2	20–22	6	19–22	6	22	5	20–22
Globe fish	2	~23	14	20–25	26	25–32	4	25–28	4	23–28	3	23–31	4	22–24
Gould's squid			2	24			2	17–18			2	16–18	1	20

Size LCF, if tail forked otherwise TL. Squid mantle length. All sizes in cm.

TABLE 7: Daily catches in pans, by species for *Dong Bang 91* in the Great Australian Bight

November 1979

SPECIES CAUGHT	Sea bream/Jackass	Red snapper/Redfish	Nannygai	Ruby fish	Latchet	Deep water flathead	Jack mackerel/Scad	Blue mackerel	Trevally	Knife jaw	Spotted boarfish	Shark	Elephant shark	Barracouta
CODE / DATE	SB	RS	NY	RF	LT	DF	JM	BM	TY	KJ	YB	SK	ES	BC
16.11.79														
17.11.79	Two hauls conducted for 16.11.79 and 17.11.79 not in Great Australian Bigh													
18.11.79	4			15	1	5			5					
19.11.79	22	34			41	203				6	34			
20.11.79	95	102		64	72	287	1	2		6	9	7		
21.11.79	22	69		2	54	272				7	17	5		
22.11.79	8	64	8		98	287				4	17	7		
23.11.79	1	25			95	626				6	32			
24.11.79	6	26			73	254				12	26	11	1	1
25.11.79	6	59			164	360				7	17	16		
26.11.79	17	44			107	352	31		2	10	20			
27.11.79		5			121	442				8	29	2		
28.11.79	4	1			65	319				9	39			
29.11.79	5	11			53	379				8	27			
30.11.79	3	4			7	89				1	5			
TOTAL	193	444	8	81	951	3875	32	2	7	84	272	48	1	1

Hake/Gemfish	Queen snapper	Hapuku	John dory	Australian Tusk	Warehou	Squid	Swallow tail	Red gurnard	Gurnard perch	Rays	Sergeant Baker	Cuttle fish	Veilfin	Fishing Time Hours	Total	No. of Trawls
F	QS	HU	JD	AT	WH	SQ	ST	RG	GP	SE	SG	CF	VF			
No catch retained.																
	7													2.82	37	3
	11	2	1			10		1	6		3			12.92	374	9
	11					17			2			1		15.50	676	9
	14	15				21						1		14.25	499	10
	9					8	17		2		1			15.67	530	8
	10		3			14	3		1	111				17.00	927	9
	11		1			6	1		16	65			1	19.25	511	8
	3			2		53			2	19		1		19.17	709	9
	5		1			38	5		1	52				15.83	685	9
	1					38			8	200				17.33	854	8
	4		3			26			7	79				19.33	556	9
	7		1			21	3		7	1				17.42	523	8
	8					1			1	1				6.42	120	4
--	101	17	10	2		253	29	1	53	528	4	3	1	192.91	7001	103

TABLE 7: Continued.

December 1979

SPECIES CAUGHT	Sea bream/Jackass	Red snapper/Redfish	Nannygai	Ruby fish	Latchet	Deep water flathead	Jack mackerel/Scad	Blue mackerel	Trevally	Knife jaw	Spotted boarfish	Shark	Elephant shark	Barracouta
CODE / DATE	SB	RS	NY	RF	LT	DF	JM	BM	TY	KJ	YB	SK	ES	BC
1.12.79														
2.12.79	3	18			68	36				4	5			
3.12.79	22	98		55	134	264			1	15	17			2
4.12.79	17	68		6	117	316			5	17	10			12
5.12.79	26	65		4	90	249			1	13	12			10
6.12.79	15	67		5	18	72	69		1	9	15			
7.12.79	3	58		1	68	131			2	18	19			
8.12.79	6	35			118	184			2	9	12	3		
9.12.79	12	28			34	121				8	11	31		
10.12.79	5	39			99	183	3			15	30	27		
11.12.79	27	74		14	91	212				16	27	5		
12.12.79	4	31			86	66				15	18		2	
13.12.79	10	46			64	126				14	13	1		
14.12.79	16	61			82	132	27		2	14	19			
15.12.79	7	75				68	116		2	12	8			
16.12.79	10	34			67	124			2	17	7			
17.12.79	9	118			57	204				16	6			
18.12.79	11	72		20	55	136				17	7			4
19.12.79	31	63		5	10	82				13	12			
20.12.79	24	168		1	37	146	4			14	12	9		
21.12.79	3	18			48	191				18	15	6		
22.12.79	4	27				100			2	16	24	2		
23.12.79	13	49				93	1		1	13	18	2		
24.12.79	7	26				94				11	11			
25.12.79	2	12				83				4	8	1		
26.12.79	2	13				5	46			8	17			
27.12.79	11	88				47				10	19	1		
28.12.79	4	140				67				9	13	5		
29.12.79	11	87		4		63			6	11	7	1		
30.12.79	14	63			4	83			3	21	10	1		
31.12.79	15	29				128	4			37	16	4		
TOTAL	344	1770		115	1347	3806	270		30	414	418	99	2	28

Hake/Gemfish	Queen snapper	Hapuku	John dory	Australian tusk	Warehou	Squid	Swallow tail	Red gurnard	Gurnard perch	Rays	Sergeant Baker	Cuttle fish	Veilfin	Fishing Time Hours	Total	No. of Trawls
GF	QS	HU	JD	AT	WH	SQ	ST	RG	GP	SE	SG	CF	VF			
														0.58		
						14			4	10			2	4.08	164	2
	8				17	96	4		11	12				18.75	756	9
	7				1	102			4			1		17.32	683	8
4	5				2	62			5					18.75	548	9
6	6					14	13		3				1	16.17	314	7
30	2		1			27	2		4	6			1	19.00	373	8
2						34			4			1		19.25	410	9
11	2					36			6	2				17.25	302	8
1	7	2	1	2		29			5	41				17.58	489	8
2	22		1	2		15	30		2	123	6	1		17.42	670	8
8	10					17	19	2	3					13.75	281	5
4	8		2			30	15		3	1				17.08	337	8
7	3					34			6	2				19.08	405	8
8	5					33		1	3	1				17.08	339	7
5	4					24		4	3	2				17.02	303	7
5	14					26		4	6	6				18.00	471	8
12	2					25			2	1				17.83	364	8
10	7					24	2		8	5				17.08	272	7
13	14					26	1		11	19			3	19.17	502	8
5	4		5			38			2	316				19.42	669	9
30	2		1			43		2	7	203				19.17	463	8
33	8					30		1	7	1				18.17	270	8
6	3					28		3	8	1				17.63	198	7
3	4		1			10		1	1	33				7.75	163	3
	4		1			11		1	2	93				13.83	203	5
	18		1			41		1	5	138				17.83	380	8
6	5		1			30	56	2	4	5				16.42	347	7
13	7					24		2	9	4				19.08	249	8
5	7					35		4	16					17.75	266	7
14						33		5	20					19.25	305	8
243	188	2	15	4	20	991	142	33	174	1025	6	3	7	508.54	11496	220

TABLE 7: Continued.

January 1980

SPECIES CAUGHT	Sea bream/Jackass	Red snapper/Redfish	Nannygai	Ruby Fish	Latchet	Deep water flathead	Jack mackerel/Scad	Blue mackerel	Trevally	Knife jaw	Spotted boarfish	Shark	Elephant shark	Barracouta
CODE / DATE	SB	RS	NY	RF	LT	DF	JM	BM	TY	KJ	YB	SK	ES	BC
1.1.80	12	41		57		139	4		3	22	16			
2.1.80		13				18	5			6	4			
7.1.80	24	21				20				11	9			
8.1.80	12	25				97				9	17			
9.1.80	41	44				65			2	21	15			
10.1.80	12	24				61			1	25	11	1		
11.1.80	29	17				48			1	20	15	3		
12.1.80	12	25				63			1	11	8			
TOTAL	142	210		57		511	9		8	125	95	4		
TOTALS														
NOVEMBER	193	444	8	81	951	3875	32	2	7	84	272	48	1	
DECEMBER	344	1770		115	1347	3806	270		30	414	418	99	2	2
JANUARY	142	210		57		511	9		8	125	95	4		
OVERALL	679	2424	8	253	2298	8192	311	2	45	623	785	151	3	2

Hake/Gemfish	Queen snapper	Hapuku	John dory	Australian tusk	Warehou	Squid	Swallow tail	Red gurnard	Gurnard perch	Rays	Sergeant Baker	Cuttle fish	Veilfin	Fishing Time Hours	Total	No. of Trawls
GF	QS	HU	JD	AT	WH	SQ	ST	RG	GP	SE	SG	CF	VF			
8	4					35		3	13		1			18.42	358	8
2	1					24		1	5					3.33	79	1
16	1					16			2	6				6.92	126	4
13	1					22		1	11	22				17.17	230	7
3	5				1	46	10	3	18					18.92	274	8
4	1					30		2	19					18.33	191	8
1	8					37		2	23					19.33	204	8
5	4					12		2	10	72				15.67	225	7
52	25				1	222	10	14	101	100	1			118.09	1687	51
	101	17	10	2		253	29	1	53	528	4	3	1	192.91	7001	103
243	188	2	15	4	20	991	142	33	174	1025	6	3	7	508.54	11496	220
52	25				1	222	10	14	101	100	1			118.09	1687	51
295	314	19	25	6	21	1466	181	48	328	1653	11	6	8	819.54	20184	374

TABLE 8: Daily catches in pans, by species for *Dong Won 509* in the Great Australian Bight

November 1979

SPECIES CAUGHT	Sea bream/Jackass	Red snapper/Redfish	Ruby fish	Latchet	Deep water flathead	Jack mackerel/Scad	Blue mackerel	Trevally	Knife jaw	Blackspot boarfish	Spotted boarfish	Shark	Leatherjacket
CODE / DATE	SB	RS	RF	LT	DF	JM	BM	TY	KJ	BB	YB	SK	LJ
15.11.79						32							
16.11.79		5				5					8	1	
17.11.79					2				1		4	2	1
18.11.79		30			3	1	2		15		59	5	5
19.11.79		17			10	10			19		71	7	23
20.11.79		101			19	14			22	11	30	16	7
21.11.79	4	17		72	157	218			11		28	23	5
22.11.79		180		41	106	52			9		24	13	2
23.11.79	2	48		64	188	61			8		46	12	
24.11.79	1	2		106	211	30		1	10	1	38	22	3
25.11.79		2		42	227	94			10		29	19	
26.11.79	1	22		62	150	47			14		49	20	
27.11.79	3	19		96	113	86			18		43	11	
28.11.79	1	8		23	73	6		1	13		42	15	
29.11.79	5	67		6	58		1	5	10		39	12	3
30.11.79	8	59		10	73	43			30	1	46	24	3
TOTAL	25	577		522	1390	699	3	7	190	13	556	202	52

Queen snapper	John dory	Australian tusk	Squid	Swallow tail	Pink snapper	Rays	Veilfin	Moonlighter	Red gurnard	Gurnard perch	Fishing Time Hours	Total	No. of Trawls
QS	JD	AT	SQ	ST	PS	SE	VF	ML	RG	GP			
											13.42	32	9
1											5.12	20	4
			1								1.55	11	1
15	1		1			2	3	2			15.65	149	11
10	3		3			40	3		3		19.07	219	12
4	4		13		3	8	6	1	8	10	16.75	277	12
4	2		23			205			17	2	17.75	788	10
5	2		15			130			6	3	17.83	588	10
2	7		18	13		494	1	2	1	9	18.58	976	11
3	2		48			191	3		1	7	18.67	580	11
4	4		72			189			3	8	17.33	703	10
5	1		78	2		146	2		3	7	16.48	609	11
2		11	40			168			4	6	17.42	620	10
7	2		27	12		250			2	10	18.67	492	10
11	2		57			214	4	1	4	7	15.67	506	10
7	2		66	10		57	7		5	20	19.17	471	10
80	32	11	462	37	3	2094	29	6	57	89	249.13	7136	152

TABLE 8: Continued.

December 1979

SPECIES CAUGHT	Sea bream/Jackass	Red snapper/Redfish	Ruby fish	Latchet	Deep water flathead	Jack mackerel/Scad	Blue mackerel	Trevally	Knife jaw	Blackspot boarfish	Spotted boarfish	Shark	Leather jacket	Barracouta
CODE / DATE	SB	RS	RF	LT	DF	JM	BM	TY	KJ	BB	YB	SK	LJ	B
1.12.79	16	89		27	80	241	1	1	34	1	47	12	22	
2.12.79	38	77		13	81	189		4	14	1	17	4	7	
3.12.79	15	102		19	222	157		4	25		28	10	9	
4.12.79	46	74		27	132	111		5	22		35	9	3	
5.12.79	15	96	12	24	163	130		3	20		25	2	5	
6.12.79	10	31		11	79			4	18	1	21	4	3	
7.12.79	11	52		14	46	7		14	20	1	29	9	4	
8.12.79	6	76		115	88	3		3	17	3	22	10	6	
9.12.79	27	31	3	43	91	1		1	14	4	18	15	1	
10.12.79	12	37		66	92	31		1	22	6	42	27	4	
11.12.79	2	19		71	124	21		5	25	7	37	21	1	
13.12.79		6		48	55	2			13	3	27	4		
14.12.79	2	10		77	100	24		15	27	4	59	11		
15.12.79	3	25		80	122	57		4	29	4	36	13	3	
16.12.79	11	165		60	127	7		4	36	3	27	8	1	
17.12.79	27	36		38	70	1		4	23	4	31	7	1	
18.12.79	7	26		52	104	1		3	34	4	30	6	9	
19.12.79	7	33		79	135	4		5	40	5	29	12	3	
20.12.79	4	2		13	17				7		3			
TOTAL	259	987	15	877	1928	987	1	80	440	51	563	184	82	1
TOTALS														
NOVEMBER	25	577		522	1390	699	3	7	190	13	556	202	52	
DECEMBER	259	987	15	877	1928	987	1	80	440	51	563	184	82	1
OVERALL	284	1564	15	1399	3318	1686	4	87	630	64	1119	386	134	1

Hake/Gemfish	Queen snapper	John dory	Australian tusk	Squid	Swallow tail	Pink snapper	Rays	Gurnard perch	Veilfin	Red gurnard	Moonlighter	Sergeant Baker	Gummy shark	Fishing Time Hours	Total	No. of Trawls
GF	QS	JD	AT	SQ	ST	PS	SE	GP	VF	RG	ML	SG	GS			
	7	2		84			59	41	20	5				19.75	789	10
5	5			65	49		5	17	7	3	2			16.03	603	9
10	2			103			1	20	9	14				19.58	750	11
3	12			53	58		8	17	3	7				17.55	626	9
4	4			54	136		4	10	4	1				18.67	712	9
2	5			27				9	3			1		16.42	231	8
	9			26			32	13	4	4				17.67	297	9
8	7	1		57	1		6	16	5	13				18.75	463	10
11	4			40			7	21	5	9				17.67	346	9
19	2	1		87			70	34	5	1				19.00	563	10
26	1	1		50			100	51	5	5				16.58	572	9
5		6		24			28	20	2	5				12.58	248	8
8	1	5		40			86	37	6	9				17.83	526	9
16	8	4		42	1		70	37	8	6			5	18.48	574	9
23	6	5		44			58	33	9	5	1			19.00	633	9
22	9	4		24	167		54	35	7	4	1			17.41	569	9
9	1	2		33			46	35	3	5			1	19.42	411	9
22	4			53			34	37	5	2	1			18.17	510	9
7	1			12			10	6	1					2.50	83	1
200	88	31		918	412		678	489	111	98	5	1	6	323.06	9506	166
	80	32	11	462	37	3	2094	89	29	57	6			249.13	7136	152
200	88	31		918	412		678	489	111	98	5	1	6	323.06	9506	166
200	168	63	11	1380	449	3	2772	578	140	155	11	1	6	572.21	16642	318

TABLE 9 the species composition of catches made by the Korean trawlers, *Dong Bang 91* and *Dong Won 509*, in the Great Australian Bight from 15 November 1979 to 12 January 1980 in terms of number of pans, percentage composition, weight (kg). Ratings from 1 to 20 are also given.

	Dong Bang 91			*Dong Won 509*							
	Total catch in pans	Percentage composition	Top 20 species	Total catch in pans	Percentage composition	Top 20 species	Total catch in pans	Percentage composition	Top 20 species	Average pan wt	Total wt in kg
Jackass fish	679	3.4	7	284	1.7	12	963	2.6	9	11.30	10 622
Red snapper	2 424	12.0	2	1 564	9.4	4	3 988	10.8	3	10.57	42 153
Nannygai	8	0.04	–	–	–	–	8	0.04	–	10.84*	694
Ruby fish	253	1.3	13	15	0.1	–	268	0.7	15	11.41	3 058
Latchet	2 298	11.4	3	1 399	8.4	5	3 697	10.0	4	10.84*	40 076
Deep water flathead	8 192	40.6	1	3 318	20.0	1	11 510	31.3	1	10.92	125 689
Jack mackerel	311	1.5	11	1 686	10.1	3	1 997	5.4	6	11.37	22 706
Blue mackerel	2	0.01	–	4	0.02	–	6	0.02	–	10.84*	65
Trevally	45	0.2	17	87	0.5	18	132	0.4	19	11.09	1 464
Knife jaw	623	3.1	8	630	3.8	8	1 253	3.4	8	11.18	14 009
Black spot boarfish	–	–	–	64	0.4	19	64	0.2		10.64	681
Spotted boarfish	785	3.9	6	1 119	6.7	7	1 904	5.2	7	10.96	20 868
Shark	151	0.8	15	386	2.3	11	537	1.5	12	10.05	5 397
Elephant shark	3	0.02	–	–	–		3	0.01	–	10.84*	32
Leatherjacket	–	–	–	134	0.8	17	134	0.4	18	11.21	1 502
Barracouta	29	0.1	18	15	0.1	–	44	0.1	–	10.84*	477
Gemfish	295	1.5	12	200	1.2	13	495	1.3	13	10.30	5 099
Queen snapper	314	1.6	10	168	1.0	14	482	1.3	14	11.87	5 721
Hapuku	19	0.1	–	–	–	–	19	0.05	–	10.84*	206
John dory	25	0.1	19	63	0.4	20	88	0.2	20	10.85	955
Australian tusk	6	0.03	–	11	0.07	–	17	0.05	–	11.49	195
Warehou	21	0.1	20	–	–	–	21	0.06	–	10.84*	228
Squid	1 466	7.3	5	1 380	8.3	6	2 846	7.7	5	11.59	32 985
Swallow tail	181	0.9	14	449	2.7	10	630	1.7	11	11.26	7 094
Pink snapper	–	–	–	3	0.02	–	3	0.01	–	10.84*	33
Moonlighter	–	–	–	11	0.07	–	11	0.03	–	10.84*	119
Red gurnard	48	0.2	16	155	0.9	15	203	0.6	16	11.12	2 257
Gurnard perch	328	1.6	9	578	3.5	9	906	2.5	10	11.19	10 138
Ray/stingaree	1 653	8.2	4	2 772	16.7	2	4 425	12.0	2	11.84	52 392
Sergeant Baker	11	0.05	–	1	0.01	–	12	0.03	–	10.84*	130
Cuttlefish	6	0.03	–	–	–	–	6	0.02	–	10.84*	65
Gummy shark	–	–	–	6	0.03	–	6	0.02	–	10.84*	65
Veilfin	8	0.04	–	140	0.8	16	148	0.4	17	11.47	1 698
TOTAL	20 184	–	–	16 642	–	–	36 826	–	–	–	408 264

* No mean weight for species available (see table 1), thus the overall mean pan weight was used.

TABLE 10: Total catch (in cartons) *Dong Bang 91* in the Great Australian Bight according to grade.

SPECIES COMMON NAME	GRADE CODE	LL	L	M	S	2S	3S	D LL	D L	F	TOTAL CARTONS
Deep water flathead	DF	561	1 626					274	1 663		4 124
Red snapper	RS		1 215								1 215
Latchet	LAT			1	33	1 051					1 085
Stingaree	SE			817							817
Squid	SQ	326	201	123	81						731
Spotted boarfish	YB	183	203	1							387
Sea bream	SB	12	2	326							340
Knife jaw	KJ		148	159							307
Barracouta	BC	11		57					116		184
Queen snapper	QS	149	3	2							154
Gurnard perch	GP		30	108							138
Ruby fish	RF		22	7	68	28					125
Swallow tail	ST					93					93
Shark	SK	16	20	6					33		75
Jack mackerel	JM			9		29	35				73
Red gurnard	RG			22							22
Trevally	TY	1	16	5							22
Thetis fish	TF		1	17							18
Sergeant Baker	SG		3	13							16
John dory	JD		12								12
Warehou	WH		11								11
Hapuku	HU							2		6	8
Gemfish	GF			5							5
Veilfin	VF			5							5
Nannygai	NY			4							4
Australian tusk	AT		3								3
Cuttlefish	CF			1	1						2
Blue mackerel	BM		1								1
Total in cartons		1 259	3 517	1 688	183	1 201	35	276	1 812	6	9 977

D = Dressed F = Filleted

TABLE 11: Total catch (in cartons) *Dong Won 509* in the Great Australian Bight according to grade.

SPECIES COMMON NAME	GRADE CODE	G1	2	3	4	5	6	7	8	9	10	11	D	I	TOTAL CARTONS
Deep water flathead	DF				33	371	1 113	147		1			69		1 734
Stingaree	SE				9	1	114	1 263						13	1 400
Jack mackerel*	JM	824	26	6											856
Red snapper	RS					123	650	19	1						793
Latchet	LAT									2	715				717
Squid	SQ			298	251	142									691
Spotted boarfish	YB				3	546									549
Knife jaw	KJ						32	254	28	3					317
Gurnard perch	GP								2	289	4	2			297
Swallow tail	ST										49	186			235
Sea bream	SB					3	5	105	22	3					138
Gummy shark	GS			6	13	26	7	6					60		118
Gemfish	GF					13	6	19	37	19			13		107
Queen snapper	QS				11	20	4	4		1			53		93
Shark	SK					58	7	1					24		90
Veilfin	VF						3	41	29	1					74
Leatherjacket	LJ												69		69
Red gurnard	RG						1	16	38	4	7				66
Trevally	TY				5	32	2	2	1				3		45
John dory	JD					24	4	1		1					30
Black spot boarfish	BB							2	13	14					2[illegible]
Ruby fish	RF									1	6				7
Barracouta	BC							2	4						6
Australian tusk	AT					5									5
Moonlighter	ML							2							2
Pink snapper	PS				1	1									2
Sergeant Baker	SG							1							1
Blue mackerel*	BM	1													1
Total in cartons		825	26	310	326	1 365	1 948	1 885	175	339	781	188	291	13	8 472

*Different grading system used Blue mackerel G1 = 10-15 fish

D = Dressed Jack mackerel G1 = 15-20; G2 20-25; G3 25-30 fish.

TABLE 12: Utilization of catch, by species, retained by *Dong Won 509* in the Great Australian Bight.

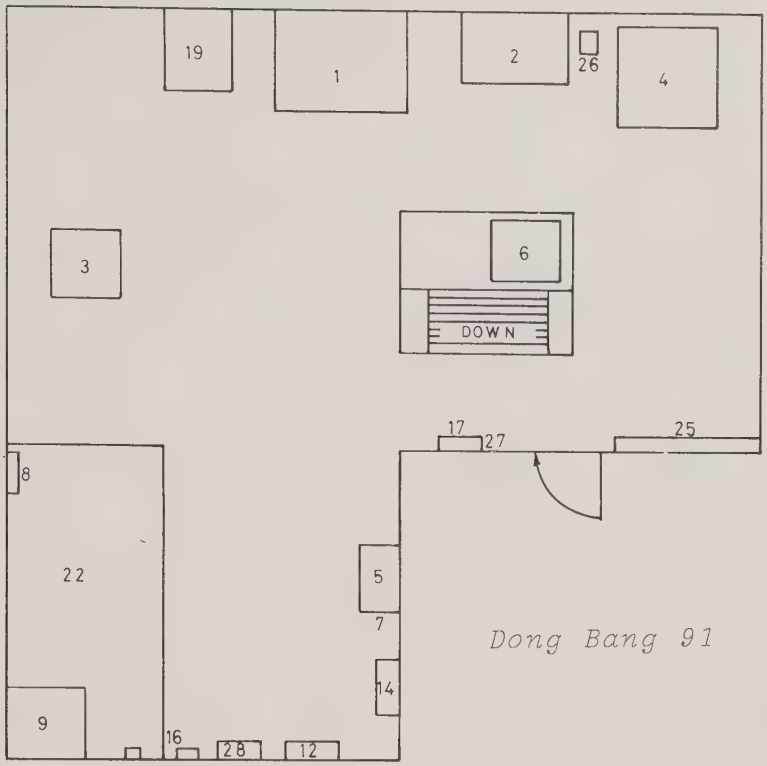
Jackass fish	Processed in Perth and sold commercially within W.A.
Red snapper	" " " " " " "
Nannygai	" " " " " " "
Ruby fish	Sold for bait.
Jack mackerel	Sold for bait.
Latchet	Large fish processed and sold within W.A., small fish sold for bait.
Blue mackerel	Some sold for bait, some sold to Malaysia for canning.
Trevally	Some processed in Perth and some sold to Malaysia for canning.
Knife jaw	Processed in Perth and sold commercially within W.A.
Black spot boarfish	" " " " "
Spotted boarfish	" " " " "
Deep water flathead	" " " " "
Shark (mixed species)	Some went back to Korea, most dumped. Overall no commercial value.
Elephant shark	Dumped, no commercial value.
Leatherjacket	Sold within Australia as headed, gutted and skinned.
Barracouta	Dumped as very poor quality.
Gemfish	Dumped as very poor quality.
Queen snapper	Processed in Perth and sold commercially within W.A. Poor recovery in processing.
Hapuku	" " " " "
John dory	" " " " "
Australian tusk	" " " " "
Warehou	Went back to Korea, no commercial value in Australia.
Squid	Went back to Korea, may have then been sent to Japan.
Swallow tail	Sold as bait.
Pink snapper	Processed in Perth and sold commercially within W.A.
Moonlighter	" " " " "
Red gurnard	Large fish processed and sold commercially within W.A. Small fish sold as bait.
Gurnard perch	Dumped.
Ray/Stingaree	Went back to Korea, no commercial value in Australia.
Sergeant Baker	Dumped.
Cuttle fish	West back to Korea, may have then been sent to Japan.
Gummy shark	Dumped. All shark mixed together.
Veilfin	Processed in Perth and sold commercially within W.A.

TABLE 13 Comparison of catch, effort and catch rates of most vessels to demersally fish in the Great Australian Bight, selected for the months of November and December and overall trawling activities.

VESSEL	TIME	DAYS ON GROUND	DAYS AT SEA	TRAWLING TIME (hr)	CATCH (kg)	MEAN CATCH RATE (kg/hr)	MEAN CATCH (kg/day) ON GROUND	MEAN CATCH (kg/day) AT SEA	REMARKS
¹F.I.S. Endeavour	Feb-Mar 1912	NA	NA	144	13259	92	NA	NA	Fishing shelf edge.
	May-June 1913	NA	NA	122	6323	52	NA	NA	Fishing deeper section-
	Total where data available	NA	NA	266	19582	74	NA	NA	used a trawl without Vigneron-Dahl gear
*S.T. Bonthorpe	9.1.30-21.1.30	7	12	372	20657	56	2951	1721	
	1.2.30-13.2.30	7	13	257	13737	54	1962	1057	
	20.2.30-5.3.30	1	14	1373	1245	1	1245	89	Engine trouble for several days
	Total 9.1.30-5.3.30	15	39	2002	35639	18	2376	914	
*S.T. Ben Dearg	27.9.49-24.3.52	NA	NA	3671	565866	154	NA	NA	For Bight area including experimental cruises.
	" "	NA	NA	3599	562714	156	NA	NA	For Bight area excluding experimental cruises. Range per cruise 30-308 kg/hr.
¹S.T. Commiles	6.10.49-9.9.51	NA	NA	2650	339793	128	NA	NA	For Bight area including experimental cruises.
	" "	NA	NA	2535	331860	131	NA	NA	For Bight area including experimental cruises. Range per cruise 18-259 kg/hr.
+Southern Endeavour	31.10.60-11.11.60	7	12	127	24714	195	3531	2060	Days on ground figure
	15.11.60-21.11.60	4	7	30	5350	177	1338	764	obtained by taking
	23.11.60-9.12.60	12	17	212	39931	188	3328	2349	hours on ground
	6.1.61-20.1.61	9	15	136	23389	172	2599	1559	÷24 and rounding.
	2.11.61-17.11.61	10	16	171	25437	148	2544	1590	Figures are therefore
	Total cruises	240	390	3808	820700	202	3420	2104	approximate.
°Saxon Onward	Mar 75-Mar 76	95	176	NA	511937	NA	5389	2909	
°Saxon Progress	Mar 75-June 76	102	188	NA	454343	NA	4454	2417	
°Saxon Ranger	Mar 75-May 75	13	25	NA	50051	NA	3850	2002	
All Saxon vessels	Total cruises	210	389	NA	1016331	NA	4840	2613	
°Miss Boomerang	22.11.77-10.12.77	18	19	227	42932	188	2385	2260	
	Total all cruises	99	129	1245	352014	283	3556	2729	Vessel made 6 cruises to G.A.B.
°Othello	Nov 1977	12		89	23130	259	1928		
	Dec 1977	24		361	103793	288	4325		
	Nov 1978	17		202	38408	190	2259		
	Dec 1978	18		257	42142	164	2341		
	Nov 77-Mar 79	272		4208	1294628	308	4760		
°Orsino	Nov 1978	13		165	46112	279	3547		
	Dec 1978	11		183	43853	239	3987		
	Mar 78-May 79	208		3208	1035495	323	4978		
°Cassio	Nov 1978	6		81	19058	236	3176		
	Dec 1978	19		341	89415	262	4706		
	June 78-Mar 79	184		3163	892516	282	4851		
°Dong Bang 91	Nov 1979	14	16	193	75891	393	5421	4743	
	Dec. 1979	31	31	509	124617	245	4020	4020	
	Nov 79-Jan 80	53	62	820	218795	267	4128	3529	
°Dong Won 509	Nov 1979	16	18	249	77354	310	4835	4297	
	Dec 1979	19	23	323	103045	319	5423	4480	
	Nov 79-Dec 79	35	41	572	180399	315	5154	4400	

Source ¹Houston, T.W. (1954) +Kesteven, G.L. and Stark, A.E. (1967).

°Department of Fisheries and Wildlife unpublished data. NA = Data not available in this form.



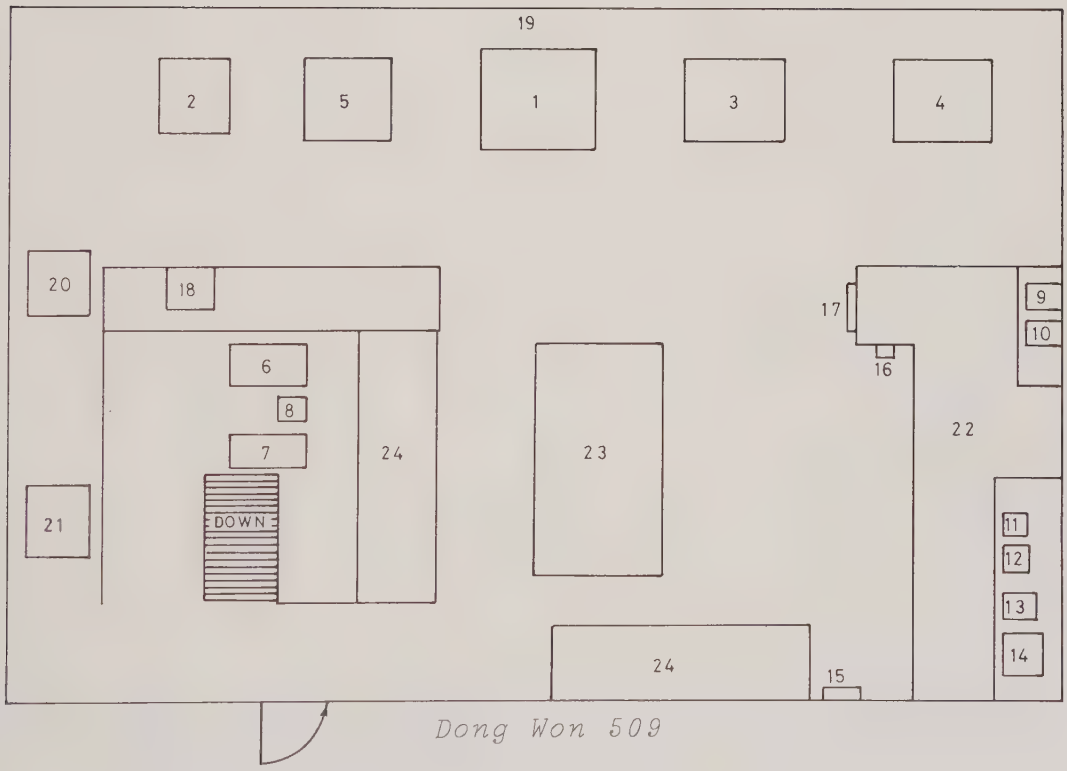


FIGURE 1 Bridge layouts of *Dong Bang 91* and *Dong Won 509*. (See page 40 for legend).

FIGURE 1 - Legend

1 GYLOT AUTO HELM

2 RPM + PROPELLOR PITCH CONTROL

3 MAIN RADAR (96 MILE MAX 100 MILE MAX)

4 - AUX. RADAR (60 MILE MAX 100 MILE MAX)

5 - MAIN ECHO SOUNDER

6 - AUX. ECHO SOUNDER

7 - NET SOUNDER (BELOW NO. 1 ECHO SOUNDER *Dong Bang 91*)

8 - WIND SPEED AND DIRECTION INDICATOR

9 - LORAN C (*Dong Bang 91* LR730)

10 LORAN C

11 - PILOT PHONE

12 - 27 MHZ VHF

13 - 27 MHZ RDF

14 - STEREO AMP AND P.A. SYSTEM

15 - CLINOMET

16 - AIR TEMPERATURE THERMOMETER AND BAROMETER

17 - SURFACE TEMP. CHART RECORDER (GAUGE RECORDER *Dong Bang 91*)

18 - 2 MHZ R.D.F.

19 - MAGNETIC COMPASS

20 - CAPTAIN'S CHAIR

21 - FRIDGE

22 - CHART TABLE

23 - COFFEE TABLE

24 - SEAT

25 SEAT

25 - SWITCH BOARD

26 - ENGINE TELEGRAPH

27 - KNOTMETER AND LOG (ABOVE SURFACE TEMPERATURE RECORDER)

28 - 150 MHZ DSB TR6213

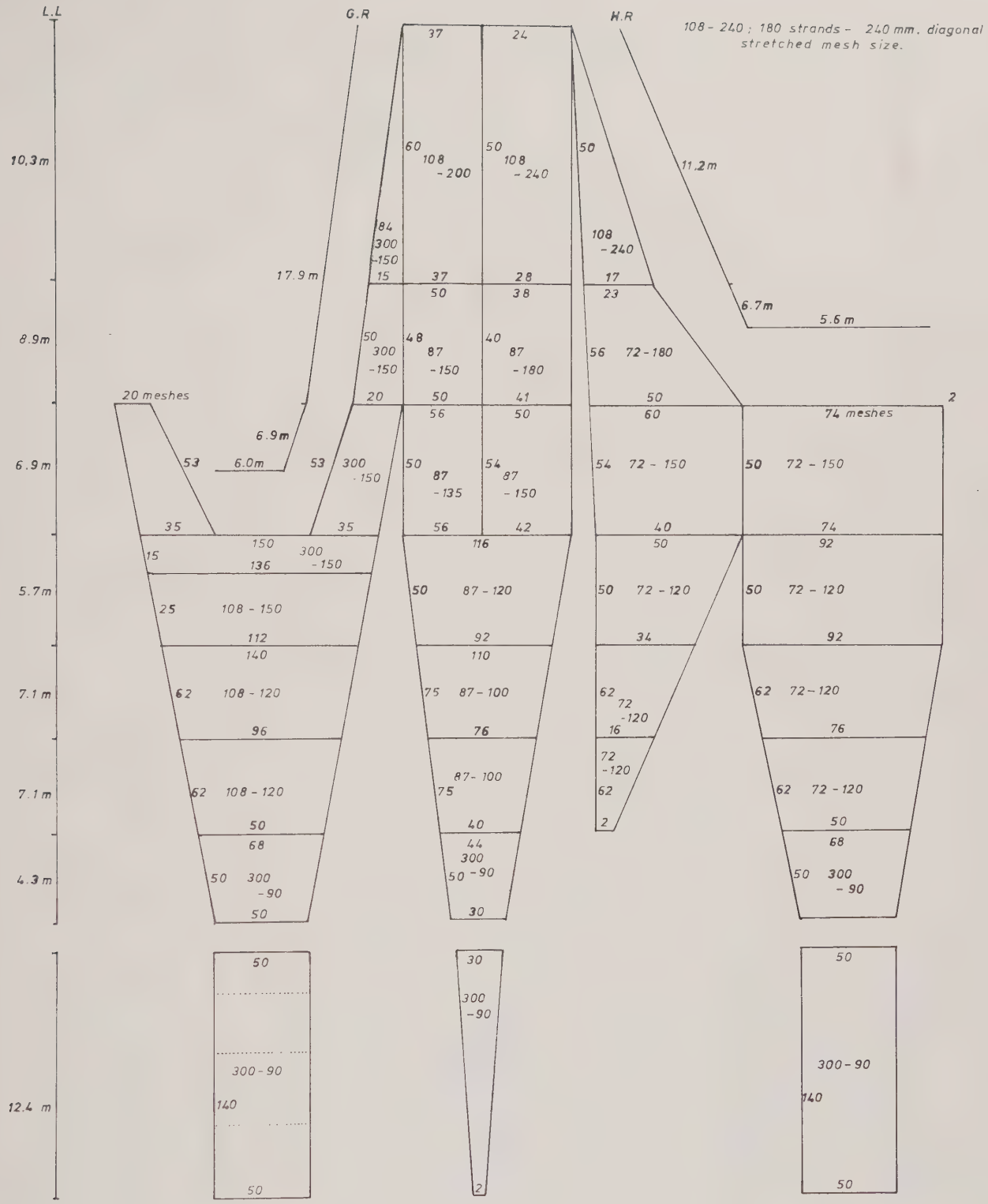


FIGURE 2 Otter trawl net plan, *Dong Bang 91*, as used in the Great Australian Bight.

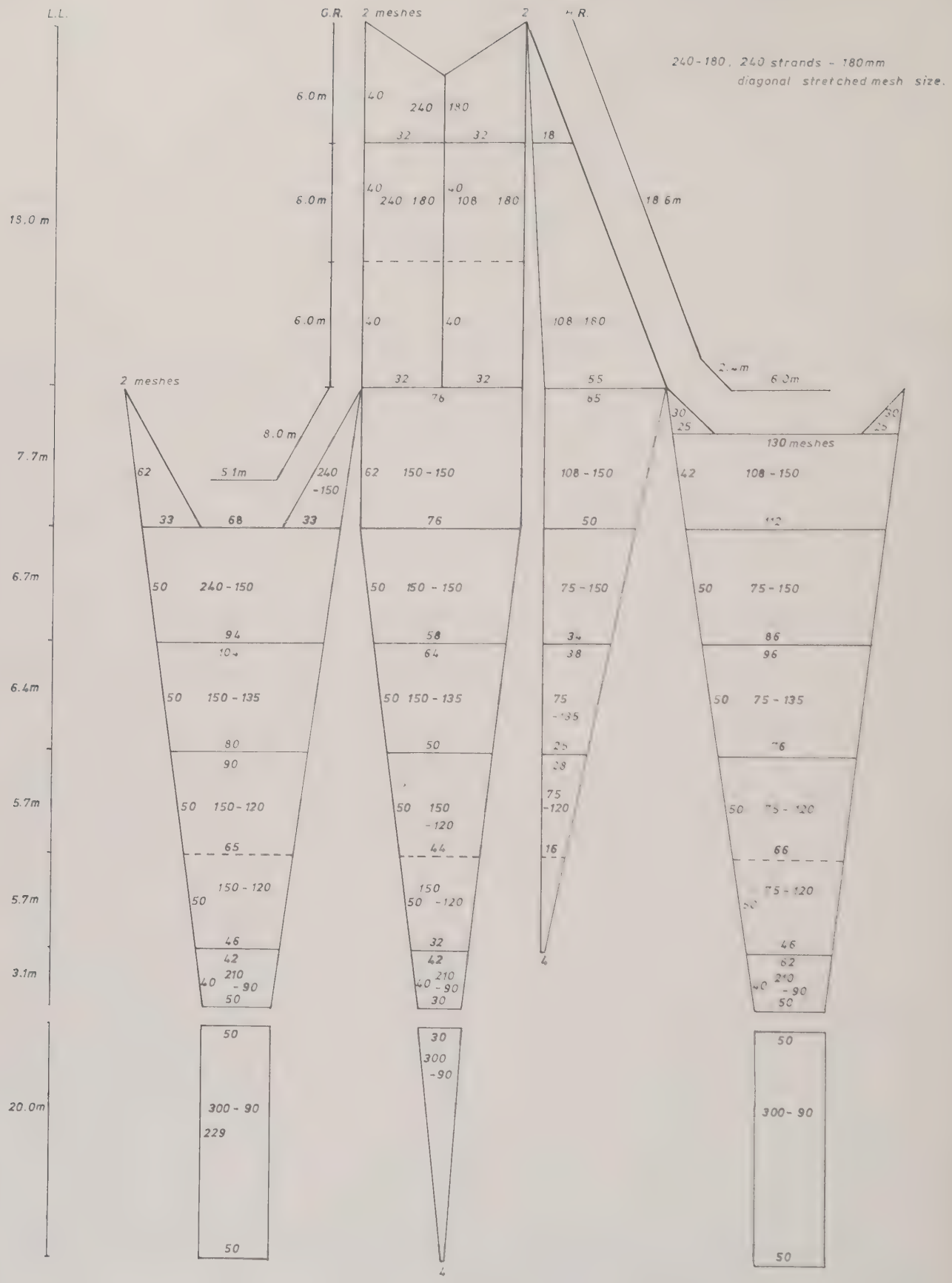


FIGURE 3 Otter trawl net plan, *Dong Won 509*, as used in the Great Australian Bight.

FIGURE 4 Ground rope and head rope plan *Dong Bang 91*, as used in the Great Australian Bight.

FIGURE 5 Ground rope and head rope plan *Dong Won 509*, as used in the Great Australian Bight.

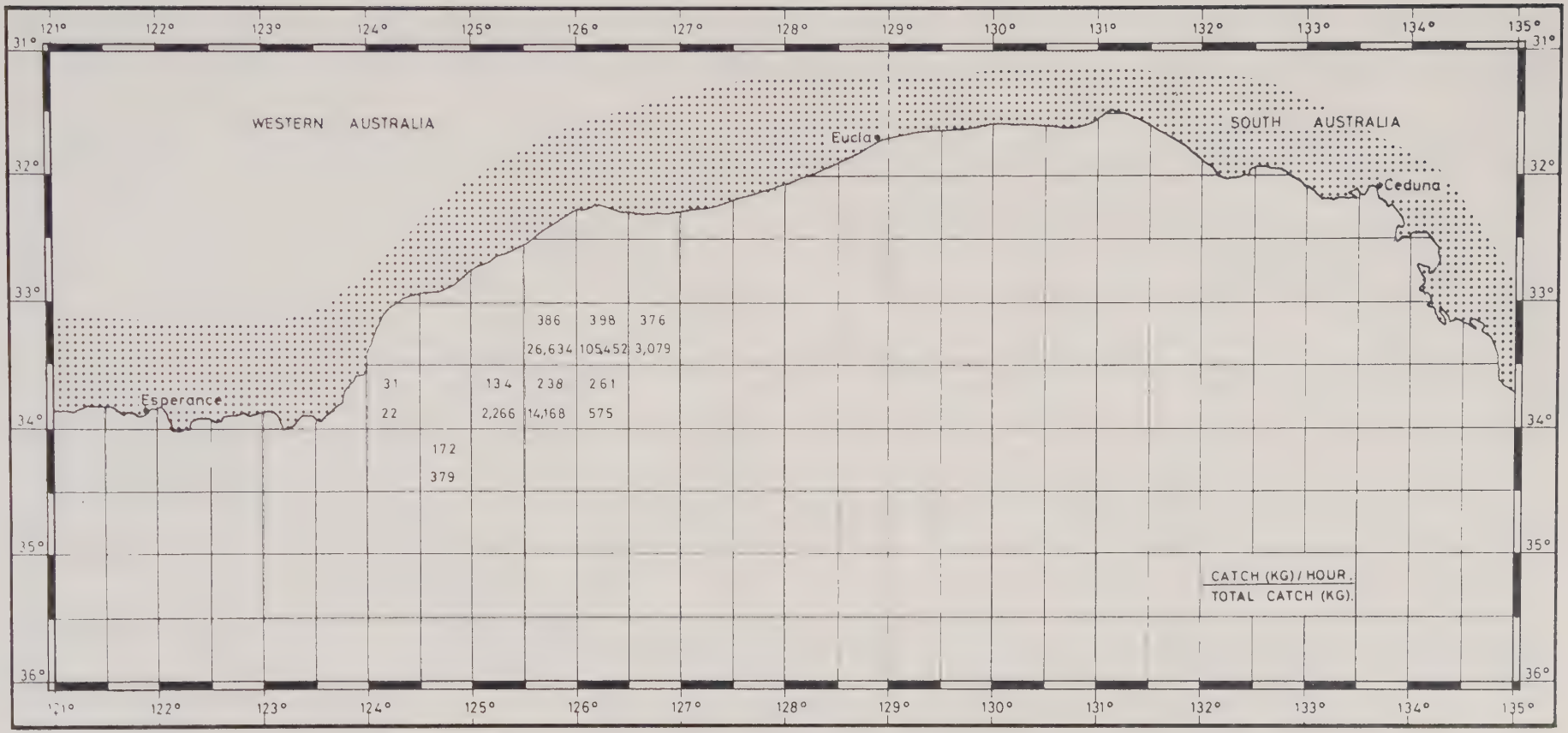


FIGURE 6 Catch rate (kg/hr) and total catch (kg) by ½ degree grid square - Korean vessels November 1979.

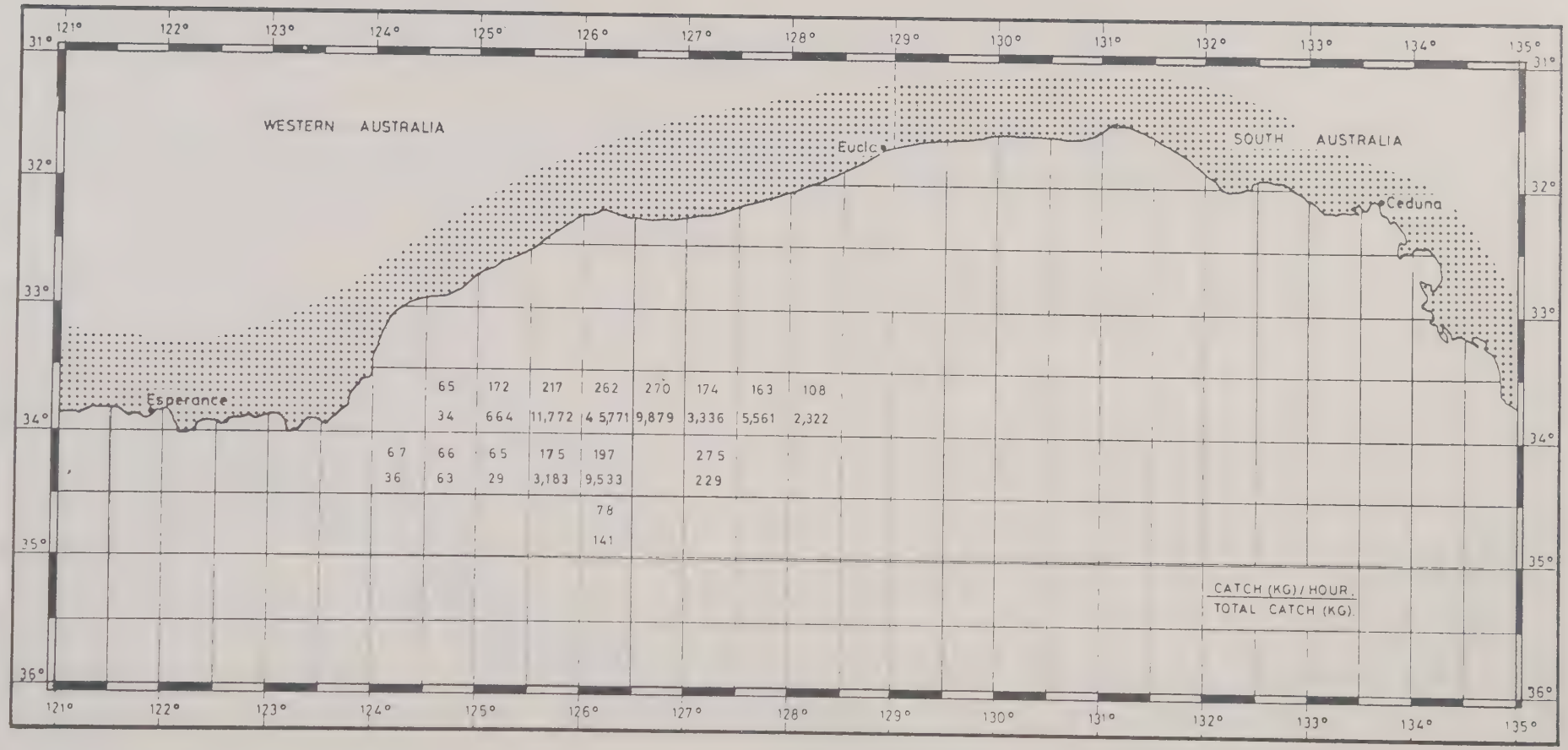


FIGURE 7 Catch rate (kg/hr) and total catch (kg) by ½ degree grid square - B.U.T. vessels November 1978.

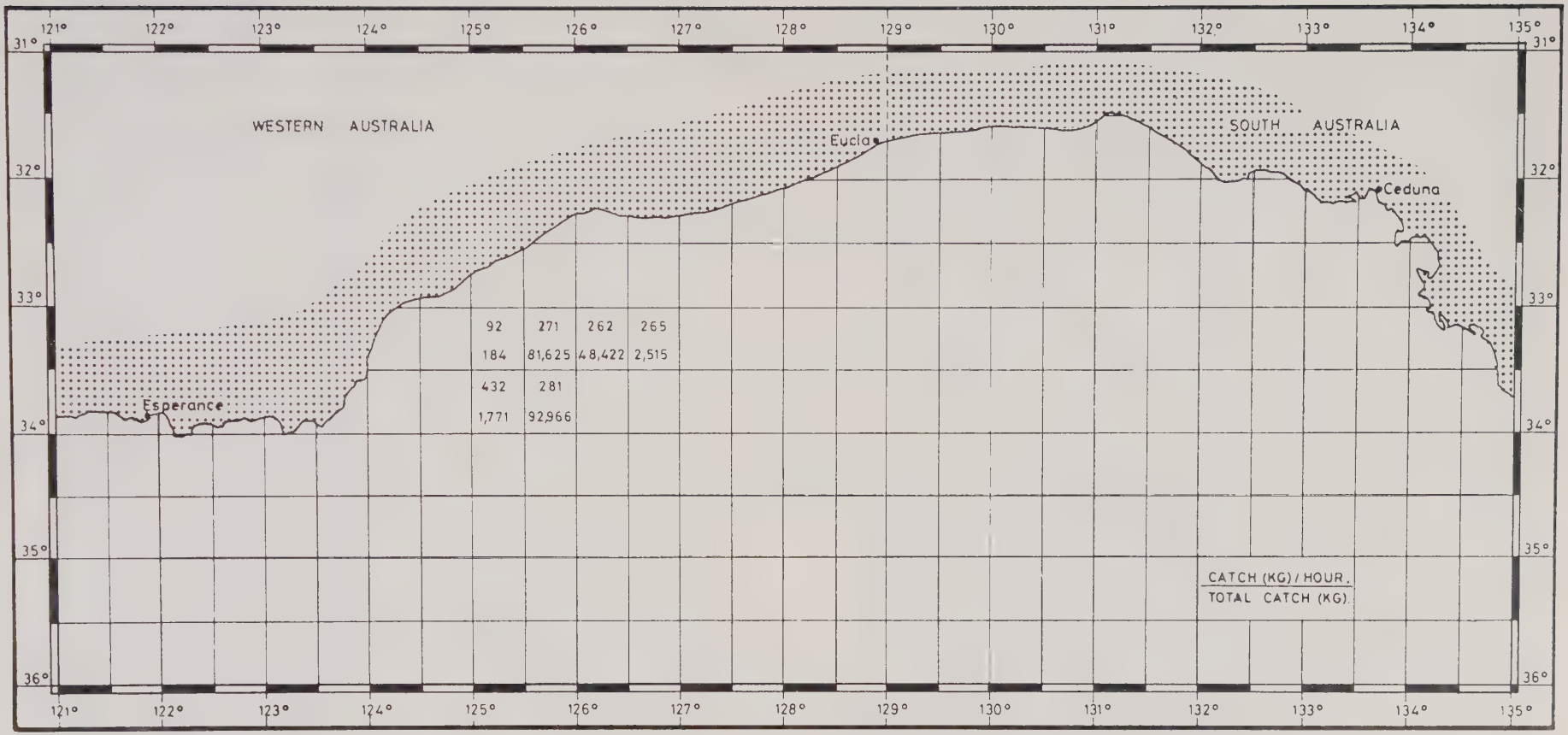


FIGURE 8 Catch rate (kg/hr) and total catch (kg) by ½ degree grid square - Korean vessels December 1979.

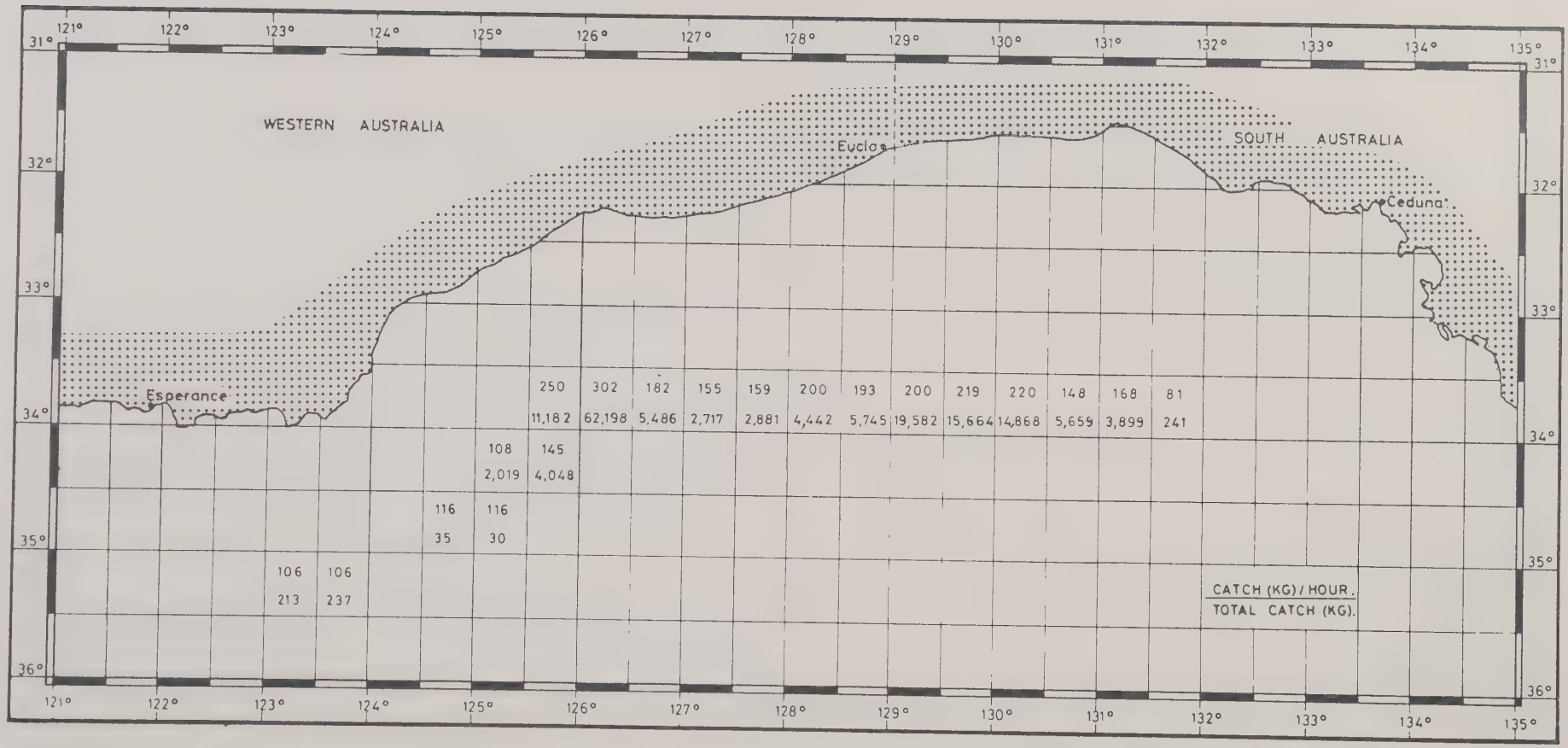


FIGURE 9 Catch rate (kg/hr) and total catch (kg) by ½ degree grid square - B.U.T. vessels December 1978.

PLATE 1 *Dong Bang 81.*

PLATE 2 *Dong Won 509.*

◀

PLATE 3

View from stern to bridge, through which fish are dropped to factory deck below.

PLATE 4

View aft, showing hauling, otter boards being made fast. ▼

◀

PLATE 5

View aft, showing net being hauled aboard.

PLATE 6

Sorting table in factory. ▼

◀

PLATE 7

Conveyor system from sorting table to freezer room.

PLATE 8

Stacking boxes into the hold. ▼

APPENDIX 1

INSTRUCTIONS COVERING WORK ABOARD VESSELS "KOREAN" IN G.A. BIGHT

The prime observer function aboard vessels concerns log books (assisting in their completion, initially, and continuing to ensure their accurate completion)

- photographic albums of commercial Bight fish species are available and should be made available to all vessels to ensure standardization of identification amongst vessels.

- Southern trawl log books and grading sheets are to be made available for completion by vessels (see separate sheets titled "Instructions for completion of trawling log - books")

1. - the following reports are to be produced, to be made available at the completion of the cruise.

(a) Operation of logsheets aboard vessel.

This report should discuss who aboard the vessel completes the sheet, how and where they complete same, and mention errors and problems associated. If improvement in sheet completion occurs during the cruise this should be mentioned also. Comment should also be passed concerning communication problems with regard to logbook completion.

(b) Description of gear used and vessel characteristics.

This report should include dimensions of nets used, e.g. headrope, bridles, mesh size throughout, board/door type and weight, etc. The trawling speed for each net type should be determined also. Vessel characteristics should be obtained where possible. Characteristics of interest are:- various length measurements, gross tonnage, H.P. of vessel, number of crew and officers, freezer capacity, endurance of vessel, etc. A gear specification sheet is available and should be completed by observers and vessel personnel completing logbooks.

(c) Description of vessel operation especially in the factory.

This report should describe the watch system aboard the vessel, the number of men involved and how the catch is processed, by whom, etc. It should also include details of time taken to shoot trawl, haul trawl, change over trawls and process a catch of x trays, etc. It should list all species saved, whether they are saved individually or grouped according to families, etc., and the condition in which species are saved, e.g. whole, gutted and gilled, headed and gutted, etc.

(d) Description of trashing aboard vessel.

Where possible trash species should be identified (family groupings may suffice in some cases) and a description given of the size range of such species. Some attention should be given to juveniles of known commercial species and where an area is assessed as being

a nursery, documentation as to position, depth, size range and approximate number of animals within such ranges should be produced (also see notes on TRASH under research section).

2. Logsheets

Logsheets should be checked daily for completion problems. Some particular shots should be followed through the complete logbook completion sequence and a duplicate logsheet produced by observers. These duplicates should leave the vessel with the observer(s) and are to check and correlate logsheet completion.

3. Pan/Tray Weights

An attempt should be made to weigh representative freezer units for each commercial species throughout the trip. The number of fish per unit should also be determined. (Length frequency sampling - see later - should assist in this work where all fish of a particular species are retained and measured for a catch).

4. RESEARCH FUNCTIONS

TRASH: Every 30 shots to establish identities and composition of a two basket (tote-box) sample of trash fish.

NOTE: This should be done more frequently if vessel moves from area to area.

BIOLOGICAL SAMPLING PROCEDURE:

DATA CONSIDERED NECESSARY (in order of importance).

(A) Length - frequency measurements

(B) Scale samples

(C) Otolith samples

(D) Gonad maturity analysis

(E) Gut analysis

Where possible data should be collected from the following species:

PELAGIC:

JACK MACKEREL

BLUE MACKEREL

SARDINE - PILCHARDS

Appendix 1 (cont'd)

DEMERSAL:

(a) SHELF

JACKASS - SEA BREAM

RED SNAPPER - BIGHT REDFISH

CHINAMAN LEATHERJACKET

HAPUKU/QUEEN SNAPPER

SPOTTED BOARFISH

SNAPPER/FLATHEAD/TREVALLY

(b) SLOPE

GEMFISH - HAKE

BLUE GRENADIER

RUBY FISH

It is important that the sample strategy is made realistically in terms of the trawling pattern of the vessel - in broad terms, sampling should be stratified by

1) DEPTH
2) TIME OF DAY
3) GEOGRAPHIC AREA

- It is not necessary to sample every trawl biologically but a realistic work-load of biological sampling should be undertaken each day.

Additional species of commercial importance (and non-commercial importance if of any abundance) should or can be sampled biologically if possible.

The observer should direct his attention to obtaining data on (A to E) in that order of priority, if for instance the vessel was remaining in the same general area for several days conducting the same type of fishing then the biological sampling for items (A to E) can be spread over several days - on the other hand, if ground is being covered rapidly, length frequencies will be given priority followed by (B to E) as time allows. (Scales - otolith samples should be taken from cm groups when length-frequency measurements are taken.)

- Gonads up to 20 per sample per species should be preserved or frozen, weights of donor fish should be obtained.

Gut analysis should be undertaken in the same manner as done in lab., i.e. scored out of 20, general analysis of approximate content and state of digestion.

C.S.I.R.O. may require alternative data collection and analysis methods - if this requires changes to the procedures suggested above, then instructions will be forthcoming by telegram.

N.B. It is only necessary to preserve in formalin gut and gonad material, whole speciments should be frozen.

Michael Walker, Scale Fish Research Officer, November 15, 1979.

APPENDIX 2 Daily Trawling Log - Southern fish species

DAILY TRAWLING LOG — SOUTHERN FISH SPECIES

SKIPPER _____ VESSEL _____ TRAWLING SPEED (knots) _____ HP _____ AREA _____ DATE _____

	POSITION AND TIME: COMMENCED FISHING TIME	COMMENCED FISHING LAT S DEG + MIN	COMMENCED FISHING LONG E DEG + MIN	COMMENCED HAULING TIME	COMMENCED HAULING LAT S DEG + MIN	COMMENCED HAULING LONG E DEG + MIN	FISHING TIME (Minutes)	AVERAGE COURSE Eg 180°	FISHING DEPTH RANGE Fathoms/Metres	BOTTOM TYPE	WIND DIRECTION °True	WIND SPEED Knots	TOTAL HEIGHT OF SEA AND SWELL Metres/Feet	BAROMETER (Millibars)	NET TYPE	MESH SIZE	STRETCHED HEAD ROPE LENGTH
TRAWL NO 1																	
REMARKS																	
TRAWL NO 2																	
REMARKS																	
TRAWL NO 3																	
REMARKS																	
TRAWL NO 4																	
REMARKS																	
TRAWL NO 5																	
REMARKS																	
TRAWL NO 6																	
REMARKS																	
TRAWL NO 7																	
REMARKS																	
TRAWL NO 8																	
REMARKS																	

SPECIES CAUGHT (BLOCKS CARTONS KILOGRAMS ETC PLEASE STATE)	SEA BREAM / JACKASS	RED SNAPPER / REDFISH	NANNYGAI	RUBY FISH	LATCHET	DEEP WATER FLATHEAD	JACK MACKEREL / SCAD	BLUE MACKEREL	TREVALLY	KINGFISH	BLACK SPOT BOARFISH	BOARFISH	SPOTTED BOARFISH	SHARK	ANGEL SHARK	LEATHER JACKET	BARRACOUTA	HAKE / GEMFISH	QUEEN SNAPPER	HAPUKU	SILVER DORY	JOHN DORY	AUSTRALIAN TUSK	WAREHOU	SQUID	SWALLOW TAIL	PILCHARD	MIXED FISH	OTHERS								TOTAL
CODE	SB	RS	NY	RF	LT	DF	JM	BM	TY	KJ	BB	BO	YB	SK	AS	LJ	BC	GF	QS	HU	SD	JD	AT	WH	SQ	ST	PD	MF									TOT
TRAWL NO 1																																					
TRAWL NO 2																																					
TRAWL NO 3																																					
TRAWL NO 4																																					
TRAWL NO 5																																					
TRAWL NO 6																																					
TRAWL NO 7																																					
TRAWL NO 8																																					

AK184 10 78 50 BKS S 5819

APPENDIX 3 Trawling Log - Southern species by grade

TRAWLING LOG — SOUTHERN SPECIES BY GRADE

VESSEL

SPECIES CODE AND GRADE

TOTAL

APPENDIX 4 Family and scientific names reconciled with common names used

HEXANCHIDAE	*Heptranchias dakini* Whitley, 1931	One finned shark
HETERODONTIDAE	*Heterodontus portusjacksoni* (Myer, 1783)	Port Jackson shark
ORECTOLOBIDAE	*Parascyllium ferrugineum* McCulloch, 1911	Rusky catshark
	Parascyllium variolatum (Dumeril, 1853)	Varied catshark
TRIAKIDAE	*Mustelus antarcticus* Gunther, 1870	Gummy shark
	Galeus boardmani (Whitley, 1928)	Sawtail shark
CARCHARHINIDAE	*Galeorhinus australis* (Macleay, 1881)	Eastern school shark
SQUALIDAE	*Squalus megalops* (Macleay, 1881)	Piked dogfish
PRISTIOPHORIDAE	*Pristiophorus nudipinnis* Gunther, 1870	Southern sawshark
SQUATINIDAE	*Squatina tergocellata* McCulloch, 1914	Ornate angel shark
RHINOBATIDAE	*Trygonorhina fasciata* Muller & Henle, 1841	Southern fiddler
DASYATIDAE	*Dasyatis brevicaudata* (Hutton, 1875)	Smooth stingray
UROLOPHIDAE	*Urolophus expansus* McCulloch, 1916	Wide stingaree
CALLORHYNCHIDAE	*Callorhynchus milii* Bory de St. Vincent, 1823	Elephant shark
CONGRIDAE	*Conger wilsoni* (Bloch & Schneider, 1801)	Conger eel
CLUPEIDAE	*Sardinops neopilchardus* (Steindachner, 1879)	Pilchard
AULOPIDAE	*Aulopus purpurissatus* (Richardson, 1843)	Sergeant Baker
CHLOROPHTHALMIDAE	*Chlorophthalmus nigripinnis* Gunther, 1878	Cucumber fish
MORIDAE	*Physiculus barbatus* (Gunther, 1863)	Southern rock cod
OPHIDIIDAE	*Dannevigia tusca* Whitley, 1941	Australian tusk
BERYCIDAE	*Centroberyx affinis* (Gunther, 1859)	Nannygai
	Trachichthodes gerrardi (Gunther, 1887)	Bight redfish/Red snapper
	Trachichthodes lineatus Cuvier, 1829	Swallow tail
ZEIDAE	*Cyttus australis* (Richardson, 1843)	Silver dory
	Zeus faber Linnaeus, 1758	John dory
VELIFERIDAE	*Metavelifer multiradiatus* Regan, 1907	Veilfin
SCORPAENIDAE	*Helicolenus papillosus* (Block & Schneider, 1801)	Ocean perch
	Neosebastes nigropunctatus McCulloch, 1915	Black-spotted gurnard perch
	Neosebastes pantlicus McCulloch & Waite, 1918	Gulf gurnard perch
	Neosebastes thetidis (Waite, 1899)	Thetis fish
TRIGLIDAE	*Chelidonichthys kumu* (Lesson & Garnot, 1826)	Red gurnard
	Pterygotrigla polyommata (Richardson, 1839)	Latchet
PLATYCEPHALIDAE	*Neoplatycephalus speculator* Klunzinger, 1872	Deep water flathead
SERRANIDAE	*Caesioperca lepidoptera* (Block & Schneider, 1801)	Butterfly perch
	Callanthias allporti Gunther, 1876	Rosy perch
	Polyprion oxygeneios (Bloch & Schneider, 1801)	Hapuku
POMATOMIDAE	*Apogonops anomalus* Ogilby, 1896	Three spined cardinal fish
CARANGIDAE	*Caranx georgianus* (Cuvier, 1833)	Trevally
	Pseudocaranx dentex (Bloch & Schneider, 1801)	Silver trevally
	Seriola lalandi Valenciennes, 1833	Yellowtail kingfish
	Trachurus declivis (Jenyns, 1841)	Jack mackerel
EMMELICHTHYIDAE	*Plagiogeneion macrolepis* McCulloch, 1914	Ruby fish
SPARIDAE	*Chrysophrys unicolor* Quoy & Gairnard, 1824	Pink snapper
MULLIDAE	*Upeneichthys lineatus* (Bloch & Schneider, 1801)	Red mullet

APPENDIX 4 (continued)

SCORPIDIDAE	*Vinculum sexfasciatum* (Richardson, 1842)	Moonlighter
HISTIOPTERIDAE	*Paristiopterus gallipavo* Whitley, 1943	Spotted boarfish
	Zanclistius elevatus (Ramsay & Ogilby, 1888)	Black spot boarfish
OPLEGNATHIDAE	*Oplegnathus woodwardi* (Waite, 1900)	Knife jaw
CHEILODACTYLIDAE	*Nemadactylus macropterus* (Bloch & Schneider, 1801)	Jackass fish/Sea bream
	Nemadactylus valenciennesi (Whitley, 1937)	Queen snapper
URANOSCOPIDAE	*Kathetostoma nigrofasciatum* Waite & McCulloch, 1915	Deep water stargazer
GEMPYLIDAE	*Leionura atun* (Euphrasen, 1791)	Barracouta
	Rexea solandri Cuvier, 1832	Gemfish
SCOMBRIDAE	*Sarda orientalis* (Temminck & Schlegal, 1844)	Oriental bonito
	Scomber australasicus Cuvier, 1832	Blue mackerel
CENTROLOPHIDAE	*Seriolella brama* (Gunther, 1860)	Warehou
MONACANTHIDAE	*Eubalichthys caeruleoguttatus* Hutchins, 1977	Blue-spotted leatherjacket
	Eubalichthys fuscosinus Hutchins 1977	Brown-curve leatherjacket
	Nelusetta ayraudi (Quoy & Gairnard, 1824)	Chinaman leatherjacket
OSTRACIONTIDAE	*Aracana aurita* Shaw, 1798	Shaw's cowfish
	Strophiurichthys inermis Fraser-Brunner, 1935	Robust boxfish
TETRAODONTIDAE	*Arothron armilla* (McCulloch & Waite, 1915)	Ringed toadfish
DIODONTIDAE	*Diodon nichthemerus* Cuvier, 1818	Globe fish
OMMASTREPHIDAE	*Nototodarus gouldi*	Arrow squid
SEPIOLIDAE		Cuttlefish

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